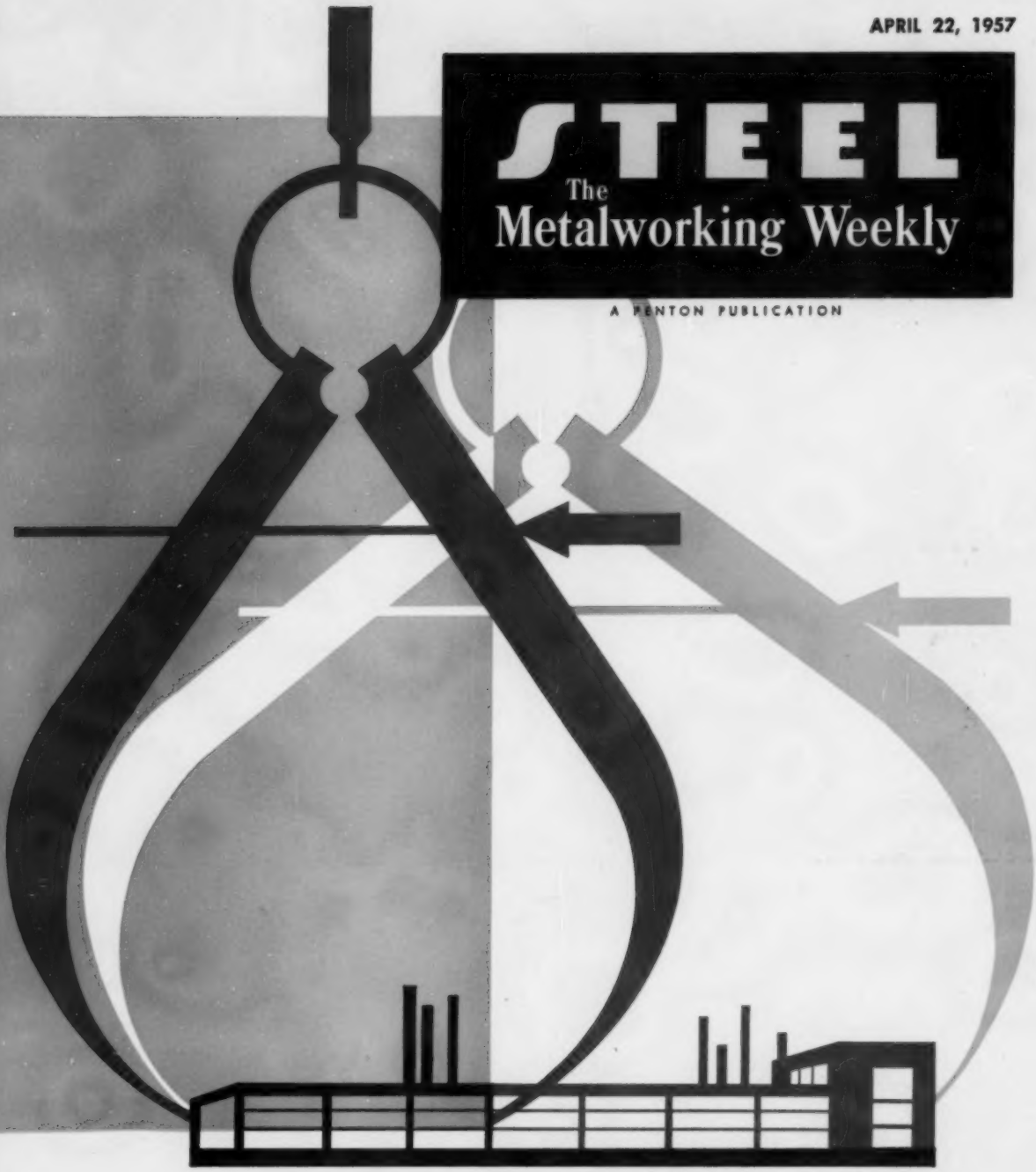
APRIL 22, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



Machine Tool Builders Build

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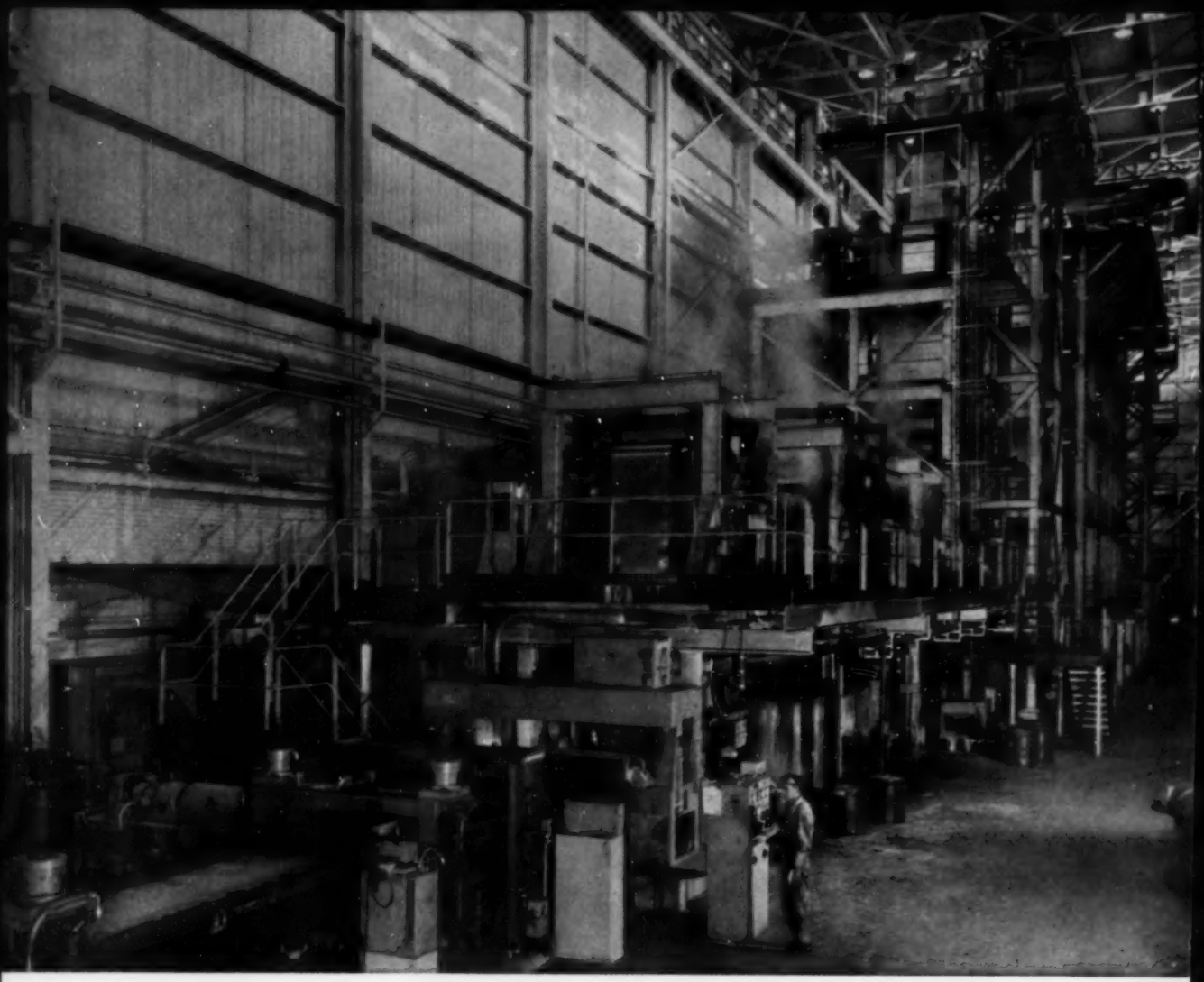

Continuous ANNEALING LINES...

• This is one of several Continuous Annealing Lines designed and built by Aetna-Standard. The line processes 48" wide strip maximum at 1000 feet a minute at Dominion Foundries and Steel, Limited, Hamilton, Ontario, Canada. This line has been designed so that the Annealing Furnace can be bypassed and strip run through for cleaning only.

Like Continuous Galvanizing or Tinning, a Continuous Annealing Line requires efficient design and rugged equipment. As a pioneer in Continuous Lines and other equipment for processing sheet and strip, Aetna has broad experience in the design of equipment required for your specific application.

Our Sales Engineering Staff is available for consultation to help analyze your requirements upon your request.

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THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. PLANTS: ELLWOOD CITY, PA., WARREN, OHIO

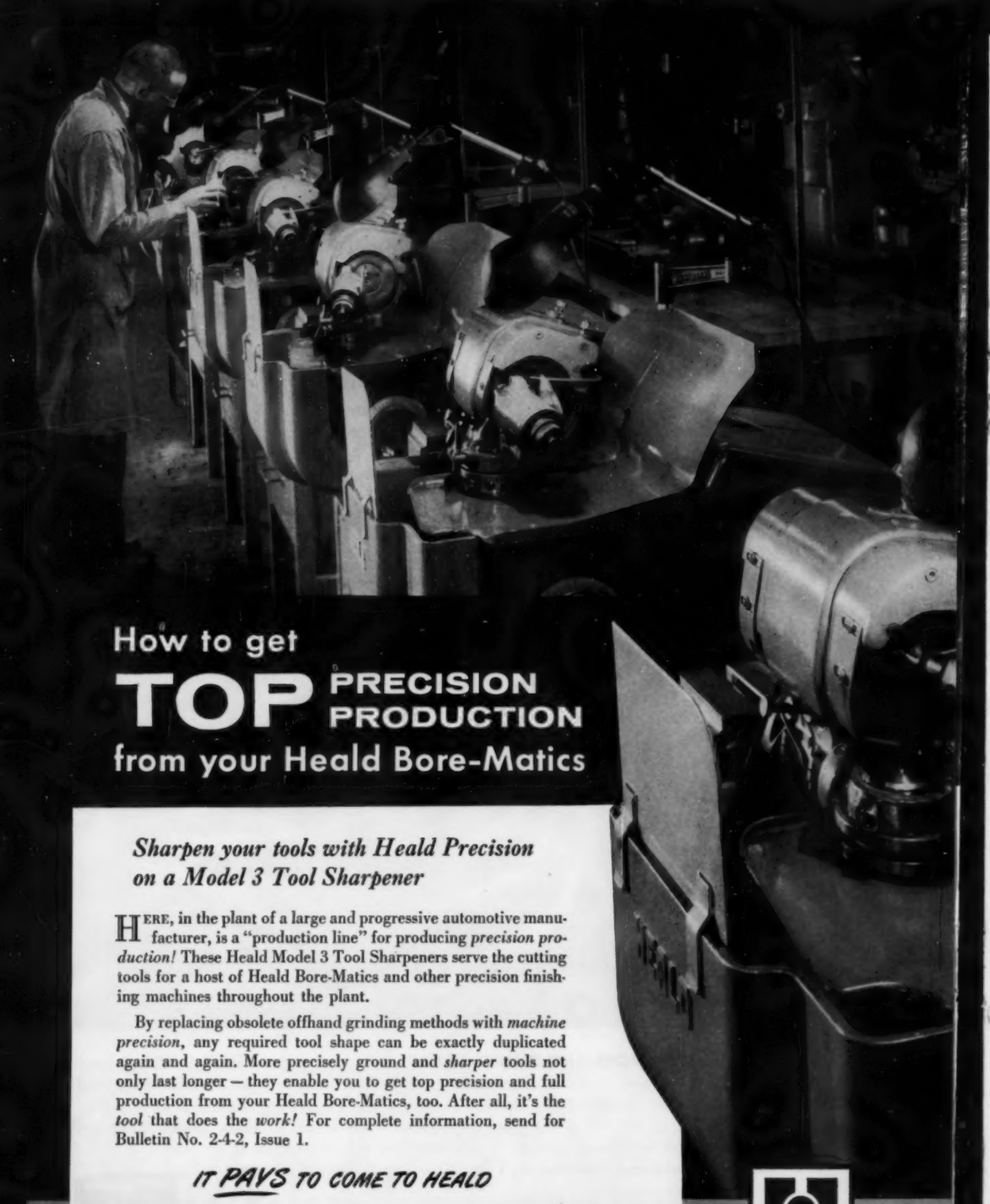
CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC

CALL BETHLEHEM FOR FLANGED-AND-DISHED HEADS—Bethlehem makes flanged-and-dished heads to meet virtually every requirement. Types furnished include ASME Code, standard and elliptical flanged-and-dished, flanged-only, dished-only, shallow-dished, tank-car, obround and double-dished. Diameters: up to 144 in.; thicknesses: 14 gage to 2½ in. Bethlehem also produces standard manhole and handhole saddles, covers and fittings. We also furnish heads with flued openings. If you would like to have complete information about the flanged-and-dished heads that are manufactured by Bethlehem just write or phone the nearest Bethlehem sales office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL



How to get TOP PRECISION PRODUCTION from your Heald Bore-Matics

Sharpen your tools with Heald Precision on a Model 3 Tool Sharpener

HERE, in the plant of a large and progressive automotive manufacturer, is a "production line" for producing *precision production!* These Heald Model 3 Tool Sharpeners serve the cutting tools for a host of Heald Bore-Matics and other precision finishing machines throughout the plant.

By replacing obsolete offhand grinding methods with *machine precision*, any required tool shape can be exactly duplicated again and again. More precisely ground and *sharper* tools not only last longer — they enable you to get top precision and full production from your Heald Bore-Matics, too. After all, it's the *tool* that does the *work!* For complete information, send for Bulletin No. 2-4-2, Issue 1.

IT PAYS TO COME TO HEALD

THE **HEALD** MACHINE COMPANY
Worcester 6, Massachusetts
Subsidiary of The Cincinnati Milling Machine Co.
Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

HEALD

OSBORN BRUSHING METHODS *worthy of your confidence*

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AFTER BRUSHING

Centerless Brushing Method

quickly produces precision finish

Osborn Matico Brush puts final finish on aluminum pistons.

WHEN it comes to precision finishing of cylindrical parts, Osborn's Centerless Brushing method does the job quickly and efficiently.

The aluminum pistons shown above are fed across the face of an Osborn Matico Bufcuto Brush mounted on a standard centerless grinder. Feather burrs are thoroughly removed, surface junctures blended, and surface finish refined . . . automatically and economically.

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An **O**sborn **B**rushing **A**nalysis, made in your plant at no obligation, will demonstrate how Osborn Power Brushing Methods can help automate your operations... improve your product. *The Osborn Manufacturing Company, Dept. G-54, Cleveland 14, Ohio.*

Write Today for the new 100-page Osborn Catalog 210-C.

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Hy Peskin photo taken at Ice Follies.

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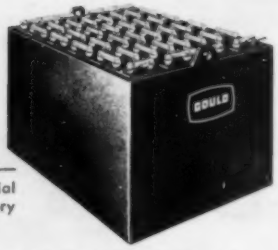
gould *extra benefits:*



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More Power to you from Gould

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The Metalworking Weekly

April 22, 1957
Vol. 140 No. 16

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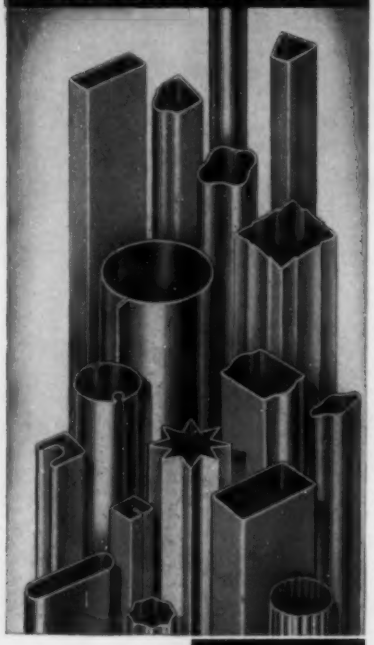
COLD ROLL FORMING TUBULAR SHAPES



Among the wide variety of things you can make on a Yoder Cold Roll Forming machine are round, square, oval, rectangular and other tubular shapes, such as illustrated. The seams may be open, lapped, butted, dovetailed, interlocking, etc.—as shown in the drawing.

Millions of feet of such unwelded tubular shapes are made from coiled strip for conductor pipe, bedsteads, lamp stands, window channel, wiring raceways, carrying rods, etc. Production ranges from 20,000 to 50,000 feet per day, with only one operator and a helper.

Yoder offers you the cooperation of their engineering staff for designing and adapting their cold roll forming machines, auxiliaries, and tooling, for the low cost production of structurals, mouldings and trim, panels, tubular and other shapes, to meet individual needs.

The Yoder Book on Cold Roll Forming is a complete, illustrated text on the art and the equipment needed for performing a variety of operations which can be combined with cold roll forming, at little or no extra labor cost. A copy is yours for the asking.

THE YODER COMPANY
5302 Walworth Ave. Cleveland 2, Ohio

YODER ENGINEERING EQUIPMENT

COLD-ROLL FORMING MACHINES

behind the scenes

Ponder This

One of the gimmicks STEEL employs to communicate ideas is known as tell-graphic. Here's how it works: A story is broken into significant hunks and presented as graphically as possible; that is, headings, charts, cartoons, symbols and color blobs are utilized to convey the most information with the least effort on the reader's part and in the least time.

Now, all this is fine, but an occulist friend solemnly informed us that, because of refraction, we see things upside down. "Visible objects," he explained, "reflect light rays, which cross each other as they enter the eye. By the time they are brought to a focus on the rods and cones of the retina, they are inverted, and if you really want to see things right side up, you will be obliged to stand on your head."

It would be unmitigated presumption to invite STEEL's 171,000 readers to stand on their heads to read the article about machine tool builders' expansion plans (page 45), so we will refrain from making such a brazen request. However, since there is some really solid information in the article, you just let those visual impressions go flashing in upside down or wrong end to—it doesn't make any difference to the centers of vision. According to STEEL's survey, business has been right side up for the machine tool boys for quite a spell and even promises to remain in this interesting condition over the next decade.

Puff! There Goes Dust!

When advertising writers prepare to astound their readers, they haul off and thunder, "At last——!" Well, it never occurred to us that some day we would be forced to use that overworked expression, but here's some news from Pittsfield, Mass., that begs for such a heading: "At last! Dusty employees to be air-blasted before entering employment area! Man-Cleaner purifies, hygienizes and sanitizes crummiest worker, delivers stainless, spotless, speckless personnel on wings of wind."

These particular immaculate workers, after the dust is blown off them, will work in an Air Force building on a Berkshire mountain top in western Massachusetts. The building will be used for the assembly and testing of high-precision radar antennas for a high priority Air Force program, and don't go asking us what it is because we don't aim to stir up the federal sleuths—or sleuthes. All we know is that the project is a baby of the Ordnance Section of the General Electric Co.'s Missile & Ordnance Systems Department. The man-cleaning vacuum is something that a rival concern might latch on to some day, and when it does, can't you just hear Betty Furness urging its use by American housewives?

Notes from Grab Bag

Time to clean out our files again, so here goes. Item: Out in California the ElectroData Division of Burroughs Corp., Pasadena, has produced an automatic blackjack dealer. This mechanical marvel is a mixture of a Univac, a Las Vegas professional and a staff sergeant we used to know at Lowry Field, Colo., who had x-ray fingers. The Datatron, as the machine is called, is automation's threat to the Army's favorite pastime of craps after taps. Card lovers may pick one of those machines for a mere quarter of a million dollars.

Item: The Van Dorn Iron Works, Cleveland, always makes out best when its salesmen are in jail. They carry around models of jail installations, and spend much time behind state and federal prison walls demonstrating special bars, locks, floors and walls.

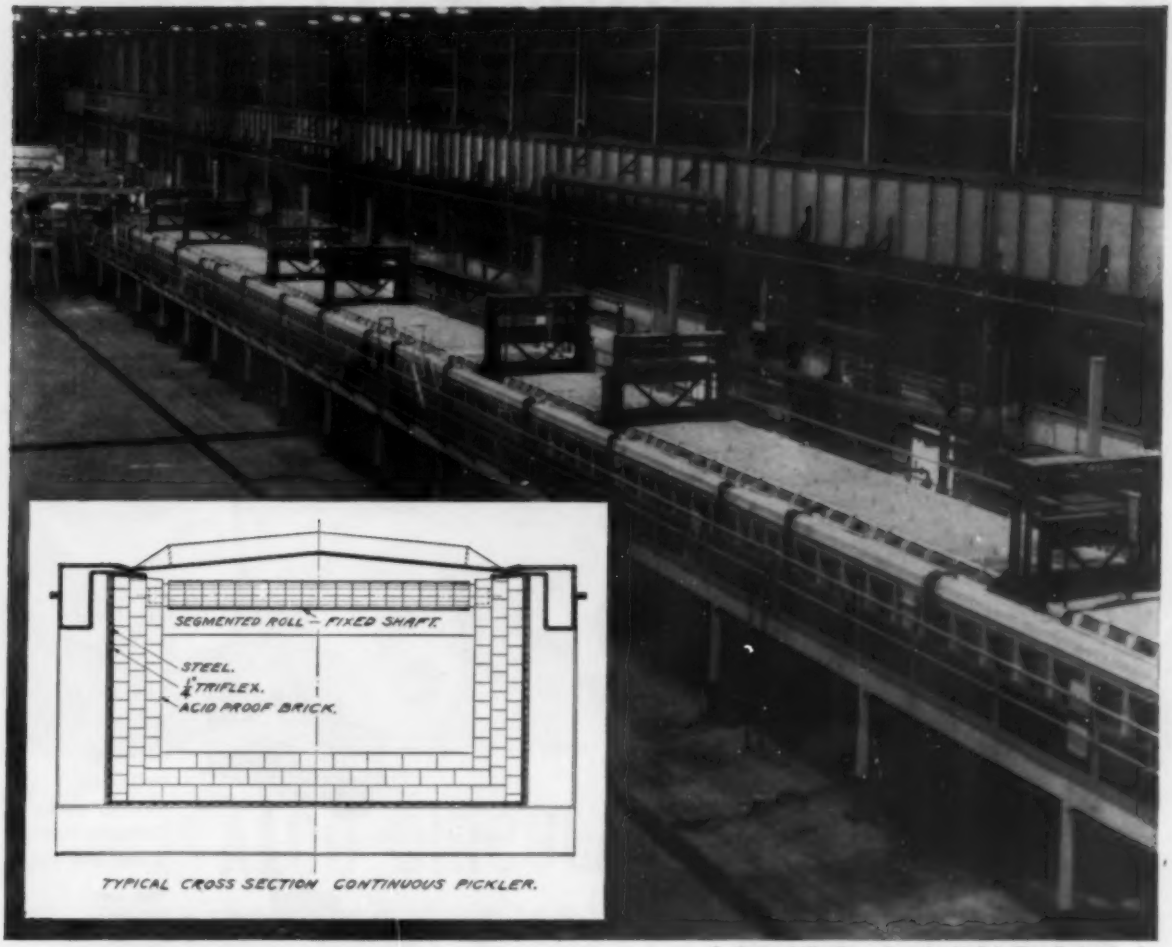
Item: Every day 10,000 men across the country sign their names with a punch. They are the nation's railroad conductors, and each uses an iron and steel punch which leaves a hole as distinctive as his signature.

Item: Leonard the alligator cost approximately $40.40, and now his owner wants to know the probability of obtaining either a six or a seven in throwing a pair of dice.

Shrdlu

(Metalworking Outlook—Page 39)

B.F.Goodrich



Continuous pickling line engineered and built by Wean Engineering Co.

Continuous pickling line at work 4 years, looks good for years more

THE high speed, efficient pickling line at U. S. Steel's Fairless Works is now in its fourth year of continuous service with only a minimum of maintenance. The reason: B. F. Goodrich Triflex rubber lining. The result: big savings through lowered pickling and maintenance costs.

Twenty years ago such tanks were an innovation. Today, the steel, rubber and brick pickling tank is a standard specification. But the fact remains that just any tank of this type construction will not solve your pickling problems. It is B. F. Goodrich Triflex lining that ends leaks. This lining is not one layer of rubber, but three—hard rubber for acid resistance sandwiched between soft rubber for protection—with expansion joints which let the rubber expand and contract with the steel to which it is attached.

Remember, Triflex lining and expansion joints, the Vulcalock and Unilock processes for attaching rubber to steel, and brick sheathing are all B. F. Goodrich developments. Out of the hundreds installed during the past 25 years, not one has ever failed to end costly shutdowns for repairs and all other forms of pickling tank troubles.

Your specification of a B. F. Goodrich rubber-lined tank brings you, in addition to these proven construction features, the engineering experience of a group of men who are thoroughly grounded in modern pickling practice and capable of designing tanks to your individual needs. It is this record of past performance and experience which insures the economy and efficiency of every B. F. Goodrich installation. *B. F. Goodrich Industrial Products Co., Dept.* ***M-907****, Akron 18, Ohio.*

B.F.Goodrich

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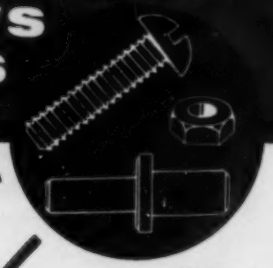
FOR FAST, EFFICIENT PRODUCTION

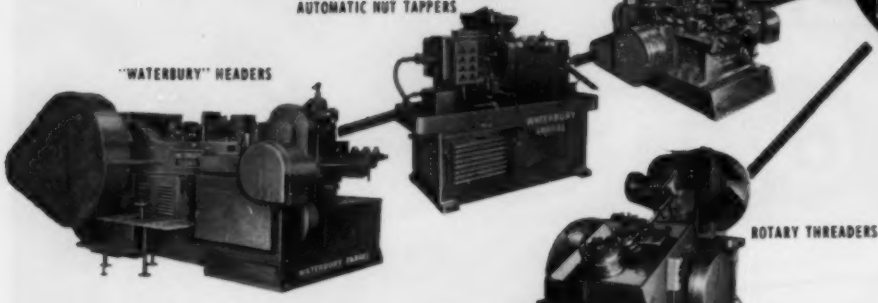
OF BOLTS, NUTS, SCREWS AND COLD FORMED PARTS



"HEADMASTERS"

AUTOMATIC NUT TAPPERS

"WATERBURY" HEADERS

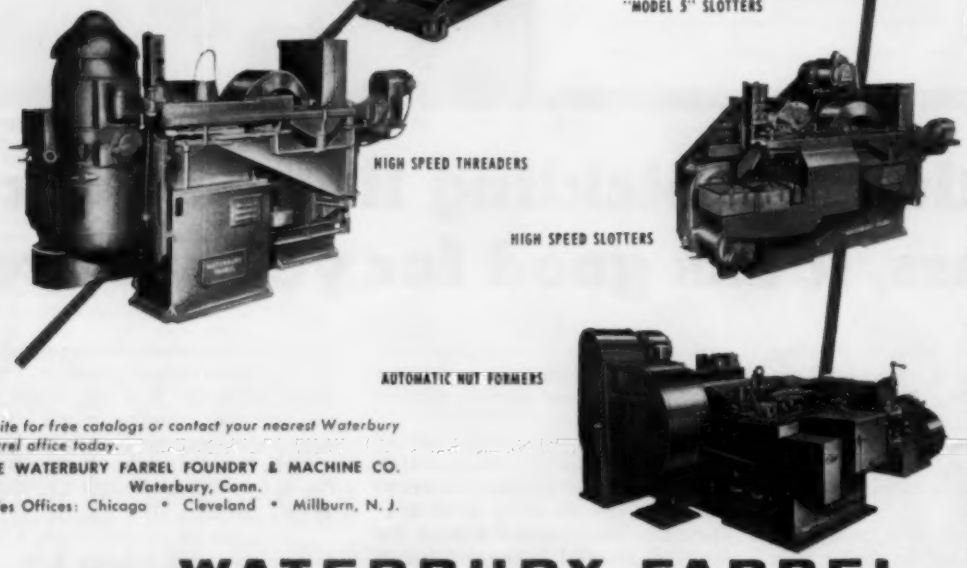


ROTARY THREADERS

Whether your part is standard or special — needed in mass volume or job lot quantities — Waterbury Farrel engineers can evaluate your requirements and recommend the proper equipment. As builders of the *world's largest selection* of bolt, nut and rivet machinery, Waterbury Farrel can often provide a standard machine, free of special engineering costs, to fit your need.

"HI-PRO" HEADERS

"MODEL 5" SLOTTERS



HIGH SPEED THREADERS

HIGH SPEED SLOTTERS

AUTOMATIC NUT FORMERS

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Headmaster
Hi-Pro
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Toggle
Tubular Rivet
S.D.S.S. Crank
S.D.D.S. Crank
S.D.T.S. Crank
O.D.D.S. Crank
O.D.S.S. Rod
O.D.D.S. Rod
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NUT MACHINES
Nut Formers
Nut Tappers
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Chamfering Machines

SCREW SLOTTERS
High Speed
"Model 5"
Rotor Vane

THREAD ROLLERS
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Rotary
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Chain Feed
Horizontal
Horizontal Side Feed
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Bolt Trimmers
Pinch Pointers
Hydraulic Presses
Rivet Drillers
Rivet Splitters
Wire Reels
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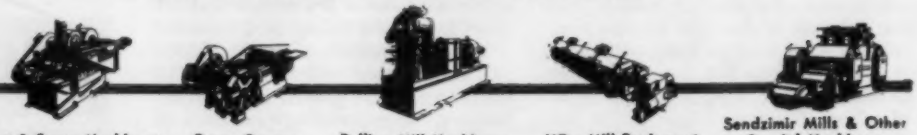

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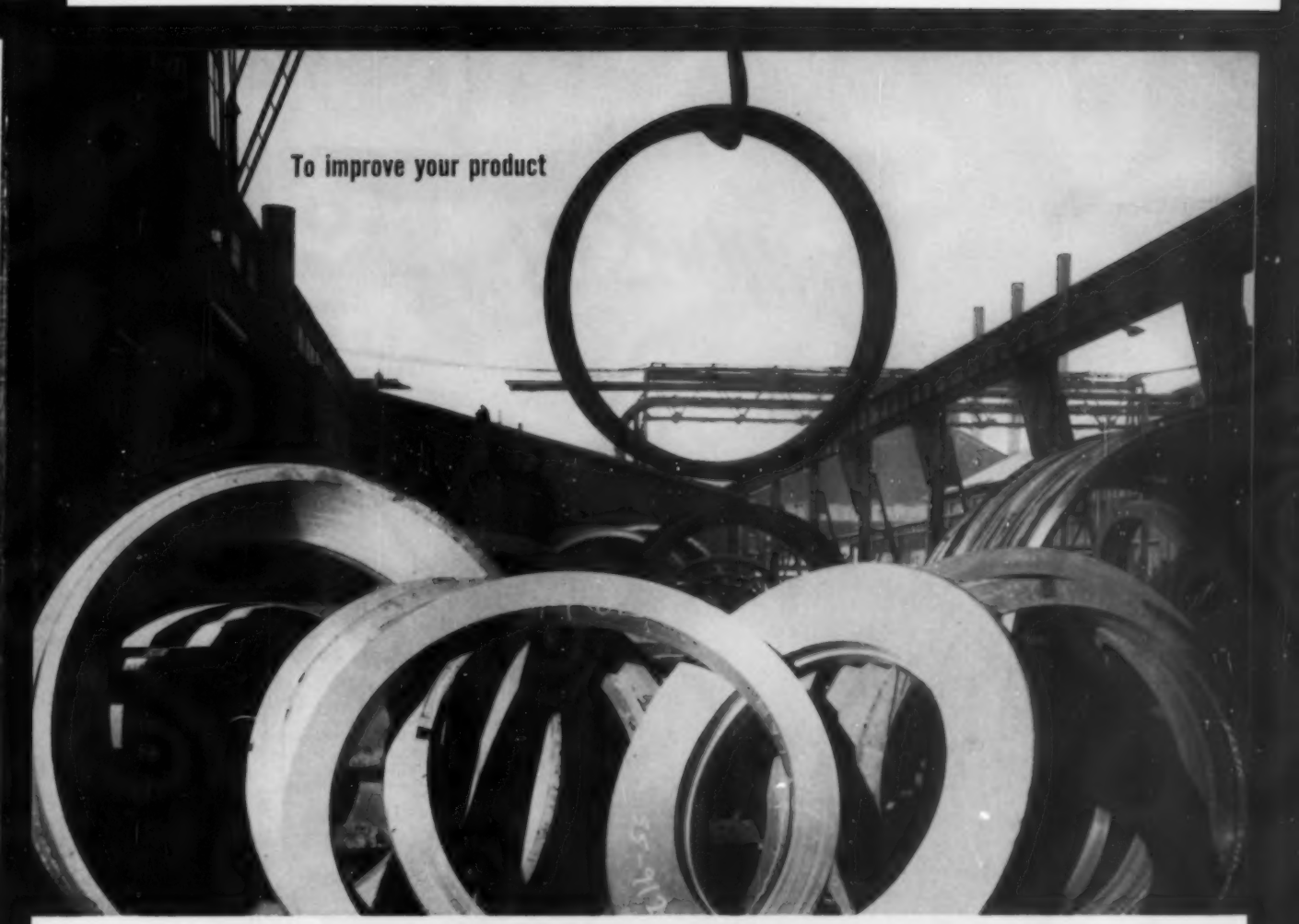
WF-30



ALCO CIRCULAR FORGINGS BRING HIGH QUALITY, UNIFORMITY

Proved steelmaking and forging techniques, new facilities at ALCO build quality and uniformity into circular forgings for savings to you; forged rings also available in new Hi-Qua-Led Steel®

Experience for over 80 years has developed ALCO's steelmaking and forging techniques for the production of high-quality circular forgings. This, coupled with new ALCO facilities such as an automatically controlled preheat furnace, modernized forging press and rolling mills, means unfailing uniformity of any order to your precise specifications — saving you money in machining and extending the service of your product.

For further advantage in machinability, ALCO also offers its circular forgings in Hi-Qua-Led Steel, a significant new development that drastically reduces machining time and tool wear without any change of basic steel properties. Hi-Qua-Led is available in all AISI open-hearth grades.

If your order is Hi-Qua-Led, ALCO metallurgists and machining technicians will be available for your trial machining runs to help you get the full benefits from this new steel.

ALCO circular forgings are available from 18- to 145-in. OD. You can get complete information from the nearest ALCO sales office, or write Spring & Forge Division, Dept. OCF-2, P. O. Box 1065, Schenectady 1, N. Y. for brochures.

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Point horn, pull trigger, fire's out! That's all it takes to knock out deadly fire with instant-action Kidde dry chemical portable extinguishers! So easy to use, even inexperienced operators get perfect fire-fighting results. Kidde's patented diffuser horn spreads dry chemical powder over wider area for greater fire-killing power. Trigger-release means faster action, feels more natural in the hand. Pick the Kidde dry chemical portable to fit your needs: 5, 10 lb. pressurized (recharged at any commercial air pump), 20, 30 lb. cartridge operated. For more information on dry chemical, carbon dioxide and wet chemical extinguishers, write today for Kidde's P-8 catalog and name of nearest distributor.

Kidde

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460 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd.
Montreal — Toronto

LETTERS
TO THE EDITORS

Looks Forward to STEEL

I would appreciate a copy of the second article in your 1957 Program for Management, "Management Development—Grooming Middle Managers" (Mar. 18, page 93). I would also appreciate a copy of the compilation, "Labor Glossary" (Mar. 11, page 122).

STEEL is routed to me through our library. Of the magazines which reach my desk, I look forward most to reading STEEL beause of its timely and thought-provoking articles.

Roy Mynsberge
Administrative Assistant
Design & Drafting
Missile Section
Bendix Products Division
Bendix Aviation Corp.
Mishawaka, Ind.

Articles of Unusual Interest

We find the articles, "Aircraft Gas Turbines Ten Years From Now" (Mar. 18, page 108) and "Exploring the Thermal Barrier" (Mar. 11, page 154), to be of unusual interest. If you can spare eight copies, we would like to give them to members of our organization.

Russell A. Yeo
Measurements Control Data Specialist
Advanced Mfg. Engineering Operation
Flight Propulsion Laboratory Department
Aircraft Gas Turbine Division
General Electric Co.
Evendale, O.

Interesting Statistics

The statistics listed in the "32nd Annual Financial Analysis of the Steel Industry" (Apr. 1 insert) are both interesting and informative. I would appreciate three copies of this analysis.

Arthur A. LeClair
Allenport Works
Pittsburgh Steel Co.
Allenport, Pa.

Dealing with $1 Billion

We were interested in your editorial, "How Much Is $1 Billion?" (Apr. 1, page 49).

For some years, we have been trying to educate our employees on this vast amount of money. In 1953, we sent to our employees and customers a booklet entitled "How Much Is One Billion?"—almost the same title.

Your editorial deals with a billion dollars in a different sense. It is as important for the rank and file to understand the thinking behind the writing of the editorial as for them to gain a better knowledge of what a billion dollars purchases.

It is unfortunate that nowhere in

(Please turn to page 12)

Schiess KZ 250 Double Column Vertical Boring Mill machining a 6-station index turntable, 24" high, 96" diameter, used by automotive manufacturer for an automatic machine.

"Our Schiess vertical boring mill DOES THE JOB 3 TIMES FASTER, MORE ACCURATELY, with a BETTER FINISH!"

Hahn Manufacturing Company, 5332 Hamilton Ave., Cleveland

Jobs of increased size and time limitations no longer hold back production at Hahn Manufacturing Company.

The company reports: "Our Schiess machine has already handled a 60" high cast iron cylinder and a 108" diameter ship propeller. We cut production time by using the two boring heads together. For instance, one head can be used for roughing while the other is finishing. Or one head can be used for turning while the other is boring.

"Our operators claim the machine is just about foolproof. They like the cross-rail electro mechanical controls. They also praise the hydraulic pre-selection of speeds, the finger-tip control for direction of feed and rapid traverse, and the all-vertical gear drive. Another thing—no special training was needed. Our regular machinists put it right to work as soon as they learned the controls.

"The Schiess mill does our big jobs just about three times faster, provides a better finish, is more accurate and results in less spoilage."

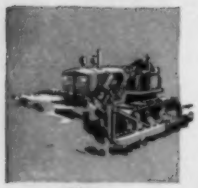
Get to know this product of Europe's largest builder of heavy machine tools. Parts and service are as close as Pittsburgh. An American Schiess engineer will be happy to help you size up this heavy producer for your heavy production needs.

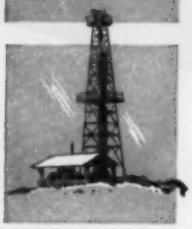
Write for catalog and complete specifications.

Standard Model KZ Double Column Vertical boring mills are available with 80", 98" and 118" turning diameters.

SCHIESS

AMERICAN SCHIESS CORPORATION • 1232 Penn Avenue, Pittsburgh 22, Pa.





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LETTERS

(Concluded from page 10)

this country can we measure $1 billion by taking a good look at a symbol of man-made production involving this kind of an expenditure. The closest we have is the Pentagon which, if I remember correctly, cost $100 million. (I suppose in today's inflated values this would be $200 million.)

W. W. Sieg
President
Titan Metal Mfg. Co.
Bellefonte, Pa.

Excellent Points in Report

We have read with interest your article, "Management Development—The Care and Feeding of the Junior Executive" (Feb. 11, page 93). We found many excellent points in it and would like to pass them along to other members of our organization. We would appreciate 20 reprints.

J. D. Williams
Vice President & General Manager
Rollway Bearing Co. Inc.
Syracuse, N. Y.

Engineer Wants Missile Data

Your articles, "Needed: Materials for Missiles" and "Specs for Missile Metals" (Feb. 25, page 86), were interesting. We would appreciate ten copies.

A. F. Bauer
Assistant General Manager & Chief Engineer
Doehler-Jarvis Division
National Lead Co.
Toledo, O.

Aluminum Welding Story Scores

We wish to obtain additional information on your article, "New Way To Weld Aluminum" (Feb. 25, page 108). We also would appreciate the address of Ravens-Metal Products Inc.

G. C. Robinson
Purchasing Agent
Blair Aluminum Furniture Co.
Marietta, Ga.

• *Contact L. A. Cook, Ravens-Metal Products Inc., P.O. Box 278, Ravenswood, W. Va.*

Inflation Brake Gets Attention

We would appreciate three copies of your article, "Pension Plan Nips Inflation" (Mar. 25, page 68).

Carl F. Carlstrom
President
Carlstrom Pressed Metal Co. Inc.
Westboro, Mass.

Quality Control Is Effective

Your Feb. 18 issue had an excellent article on statistical quality control applications, "Quality Control for Automatics" (page 178). I would appreciate a copy.

John R. Gardner
Market Research Analyst
A. P. Green Fire Brick Co.
Mexico, Mo.

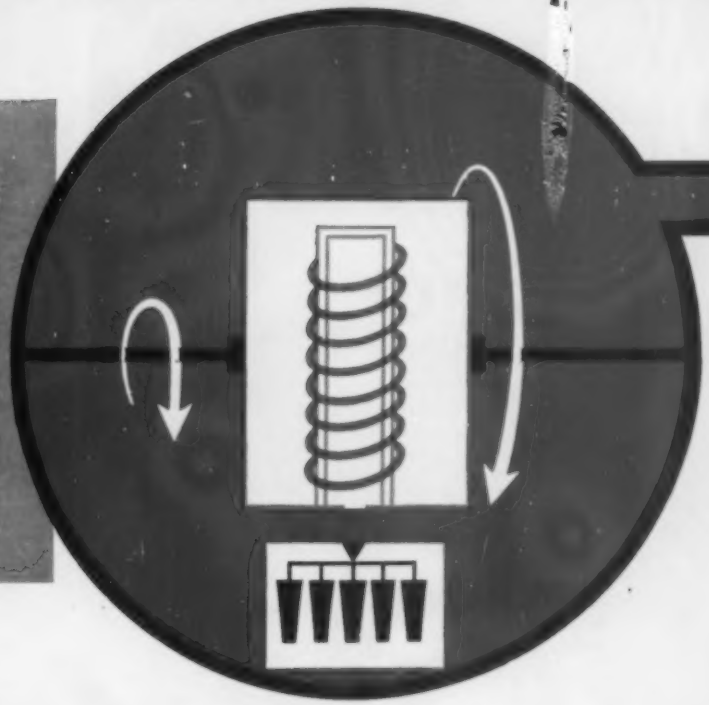
It is a most interesting and instructive article. I would appreciate a copy.

T. S. King Jr.
Captain, U.S. Navy
Manufacturing Officer
U.S. Naval Gun Factory
Washington

I would appreciate two copies. Thank you for this interesting article on a subject which we are so concerned about.

W. L. Ruppe
Quality Control Manager
Purolator Products Inc.
Rahway, N. J.

design with austenal in mind



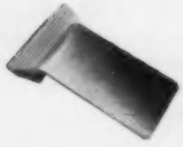
New **VACUUM MELTING** *techniques being developed by* **MICROCAST** *give promise of higher performance parts for the future*

Austenal vacuum melting and casting techniques being currently developed may have a big place in your future designs.

Vacuum melting promises greatly improved investment castings and a wider range of cast parts, because it makes available alloys with outstanding high temperature properties. By removing harmful gases and holding down objectionable oxide inclusions, vacuum melting results in parts that are more ductile, stronger and tougher than before. Vacuum melting makes possible the use of alloys that were formerly uncastable.

For instance, these new Austenal techniques are already being studied for aircraft manufacturers on a development basis. Vacuum melting has helped furnish extremely high quality vanes and blades for future jet engines.

Discuss this new Austenal development with your Austenal representative. Vacuum melting may be the way for you to obtain higher performance in designing parts for tough jobs of the future.



---It's **NEW** *from Austenal*

Vacuum casting of turbine buckets such as this has been accomplished and the application of this method is being planned for other jet engine components.

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7001 SOUTH CHICAGO AVE., CHICAGO 37, ILL.

ACME STEEL **STEEL STRAPPING** unitizes and braces aluminum ingots for carload shipping. *(Idea No. U1-4)*

ACME STEEL **STEEL STRAPPING** reinforces packages of stainless steel sheets for export shipment. *(Idea No. U6-11)*

ACME STEEL **STEEL STRAPPING** braces cast iron pipe for safe, secure movement by motor truck. *(Idea No. U5-1)*

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A product protection-wise Acme Idea Man is located near your plant. He is immediately available to discuss your packaging problems and provide you with hundreds of in-use Acme Steel Strapping ideas for better packaging and shipping. The seven ideas shown on these pages are included in the Ideas-In-Action Report files your Acme Idea Man will be pleased to show you. Among the many Ideas-In-Action Reports Acme Steel has developed from the experiences of dozens of industries are sure to be applications that can be applied to your particular operations with important time and dollar benefits to you.

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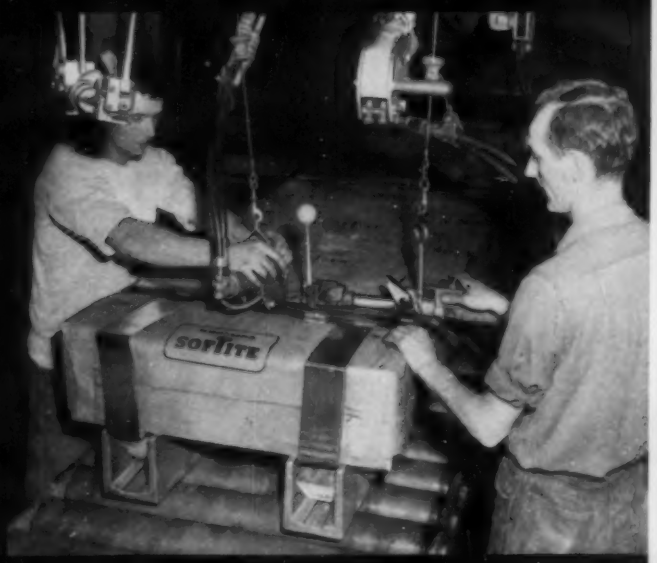
Your *Acme Idea Man can be contacted at the nearest Acme Steel office. Look under "Steel Strapping" in your classified directory, or send the coupon for full information.

ACME STEEL **STEEL STRAPPING**

ACME STEEL **STEEL STRAPPING** unitizes zinc slabs for fast, economical, mechanized handling. *(Idea No. U6-3)*

ACME STEEL **STEEL STRAPPING** palletizes coils of tire bead wire for better handling and storage. *(Idea No. S4-4)*

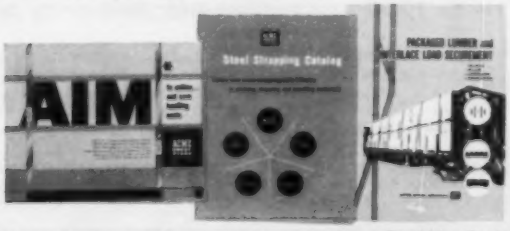


ACME STEEL **STEEL STRAPPING** applied with hydraulic tools speeds sheet steel packaging. *(Idea No. U6-5)*

ACME STEEL **STEEL STRAPPING** skid-loads coils of aluminum for safe, easier handling. *(Idea No. U6-10)*

3 IDEA BOOKS

These three information packed Acme Steel Idea Books are available to you on request. They will provide dozens of clues to better ways to package and protect your products and plant output.



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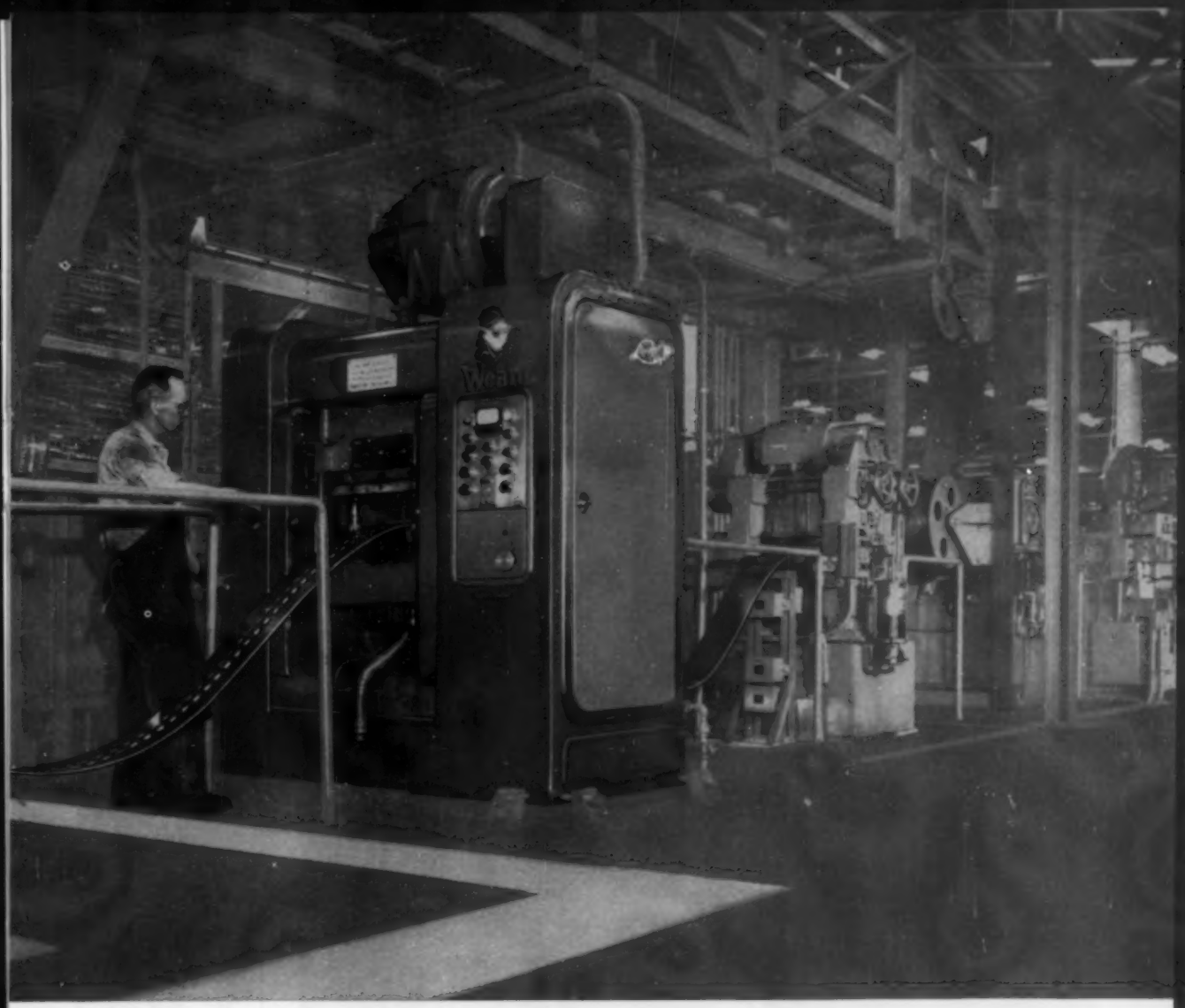

The Wean "Flying Press"

continuous strip feed eliminates stop-and-go operation in production lines

In many production lines utilizing conventional presses, the production rate of the entire line is governed by the speed of the press. Thus, though the balance of the line may have a higher production potential, actual production is curtailed by the old-fashioned stop-and-go action of the press. In the case of the Wean "Flying Press", however, the combination of a continuous feed principle plus speeds many times in excess of conventional press rates enables a production line to produce at maximum capacity.

High speed, automated and semi-automatic operations in particular benefit from the many revolutionary advantages inherent in the Wean "Flying Press".

Built in feed rolls — press feed, can be varied while press is running — all controls centralized .... these are but a few of the many features of the Wean "Flying Press". We could discuss simple floor mountings, ultra-high speed operation and many other advantages. However, you can get the complete story by writing today for your copy of the Wean "Flying Press" brochure.

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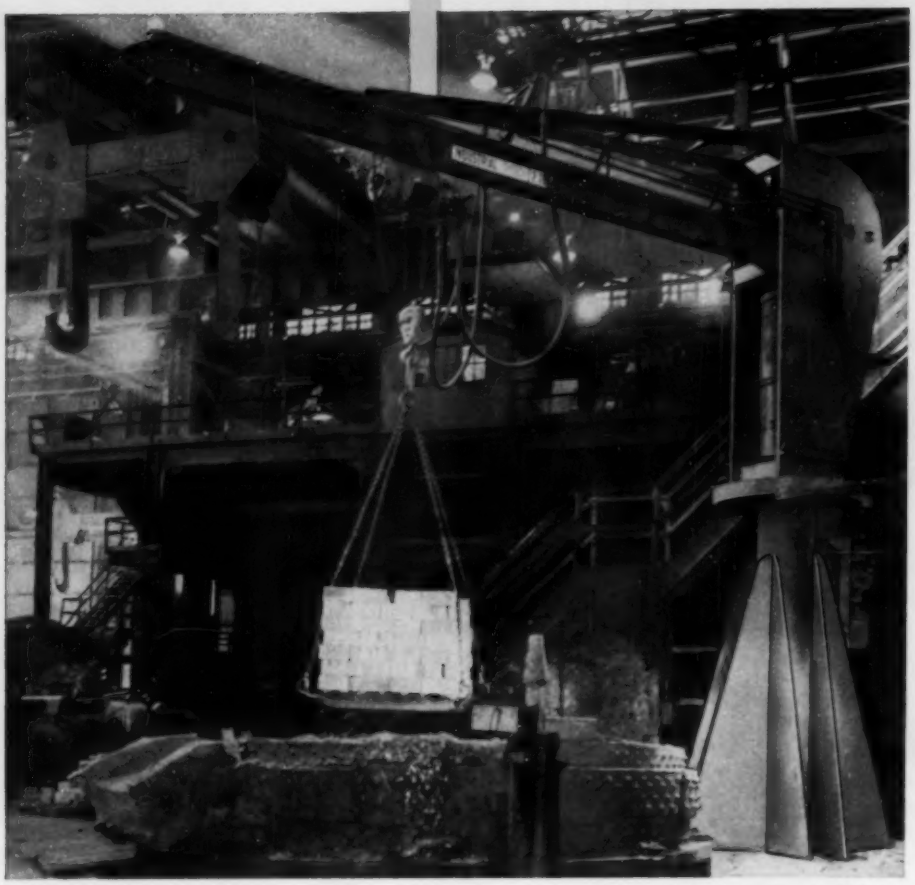
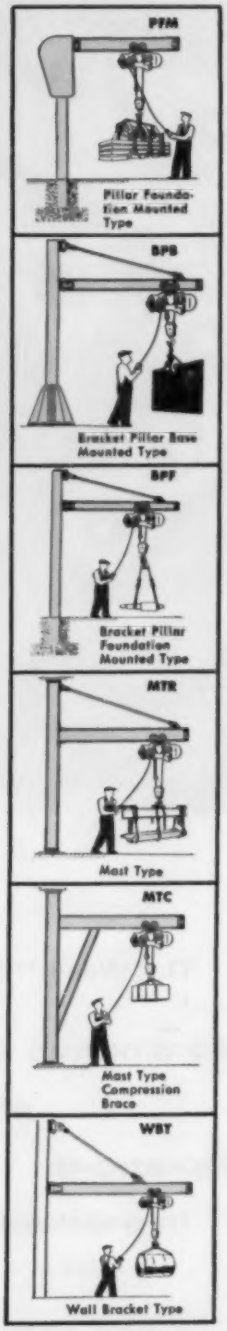


Motorized PBM Pillar Base Mounted Type



This *Industrial* Heavy Duty Motorized Jib Crane is shown handling a heavy load of fire brick over an open hearth ladle lining pit in a large steel mill. Remote control protects operator from hazardous conditions such as this. The *Industrial* Jib Crane performs with the utmost reliability, so vital in steel production.

Industrial PBM Jib Cranes are built for rugged service. Heavy Seamless Steel Column is self-supported affording minimum overhead and floor obstruction. The head is all-welded construction providing a rigid support for the I-Beam boom. Heavy-duty ball bearings permit free rotation through full 360° in either direction or travel may be limited to any number of degrees.

Industrial makes many other types of Jib and Overhead Traveling Cranes to fill any need. Consult with Industrial for cranes to solve your materials handling problems.

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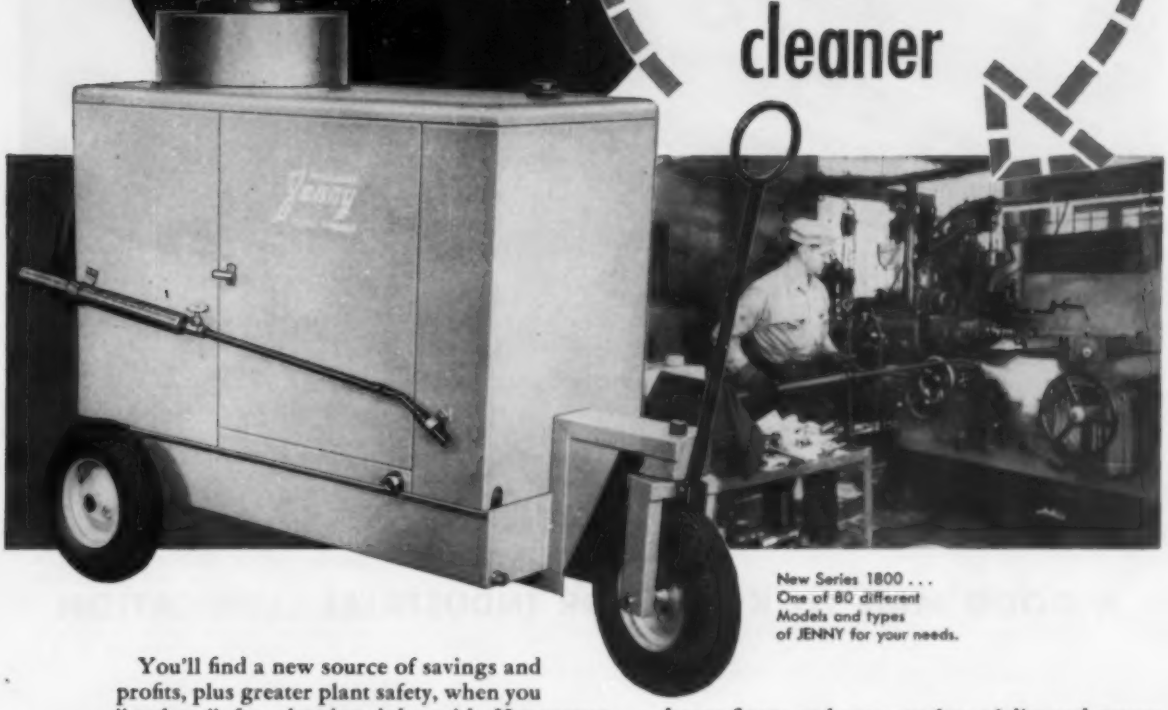

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Apr. 23-24, American Institute of Electrical Engineers: Biennial conference on electric heating, Commodore Perry hotel, Toledo, O. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Apr. 23-25, Grinding Wheel Institute and Abrasive Grain Association: Spring meeting, Homestead, Hot Springs, Va. Information: Hunter-Thomas Associates, 2130 Keith Bldg., Cleveland 15, O.

Apr. 23-26, Steel Shipping Containers Institute Inc.: Annual meeting, Palm Beach Biltmore hotel, Palm Beach, Fla. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

Apr. 24-25, National Industrial Research Conference: Conrad Hilton hotel, Chicago. Sponsor: Armour Research Foundation, Illinois Institute of Technology, 35 W. 33rd St., Chicago 16, Ill.

Apr. 24-26, American Zinc Institute and Lead Industries Association: Joint annual meeting, Drake hotel, Chicago. Information: 60 E. 42nd St., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

Apr. 25-26, American Society of Mechanical Engineers and Society for Advancement of Management: Annual management engineering conference, Hotel Statler, New York. Society's address: 74 Fifth Ave., New York 11, N. Y. Executive vice president: Harold R. Bixler.

Apr. 25-26, American Society of Mechanical Engineers: Railroad division conference, Sheraton hotel, Chicago. Society's address: 29 W. 30th St., New York 18, N. Y. Secretary: C. E. Davies.

Apr. 27-May 2, Scientific Apparatus Makers Association: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 20 N. Wacker Dr., Chicago 6, Ill. Executive vice president: Kenneth Andersen.

Apr. 29-May 1, Association of Iron & Steel Engineers: Spring conference, Hilton Plaza hotel, Cincinnati. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Apr. 29-May 1, Chamber of Commerce of the U.S.: Annual meeting, Washington. Chamber's address: 1615 H St. N.W., Washington 6, D. C. Executive vice president: Arch N. Booth.

Apr. 29-May 3, National Materials Handling Exposition: Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Apr. 30-May 1, Metal Powder Association: Annual meeting and exhibit, Drake hotel, Chicago. Association's address: 130 W. 42nd St., New York 36, N. Y. Secretary: Kempton H. Roll.

Apr. 30-May 2, Investment Casting Institute: Annual spring meeting, Sheraton Park hotel, Washington. Institute's address: 27 E. Monroe St., Chicago 3, Ill. Executive secretary: H. P. Dolan.

May 1-3, Electronic Components Symposium: Morrison hotel, Chicago. Information: J. S. Powers, Electronic Components Symposium, 84 E. Randolph St., Chicago 1, Ill.

May 1-3, Society for Experimental Stress Analysis: Annual meeting, Hotel Statler, Boston. Society's address: P.O. Box 168, Cambridge 39, Mass. Secretary: W. M. Murray.

May 5-7, National Tool & Die Manufacturers Association: Spring meeting, Mayflower hotel, Washington. Association's address: 907 Public Square Bldg., Cleveland 13, O. Executive secretary: George S. Eaton.

May 5-9, American Ceramic Society: Annual meeting, Statler Hilton hotel, Dallas. Society's address: 4055 N. High St., Columbus, O. Secretary: Charles S. Pearce.

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Republic Roll-Over Boxes are designed for use with trucks having a revolving-fork carriage. This permits the operator to pick up a box, roll it over and dump the contents quickly and easily.

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CLIMALENE COMPANY DOES IT WITH THE HELP OF REPUBLIC ROLL-OVER BOXES

The Climalene Company's Chicago packaging operation is proof of the savings that can be attained when materials handling equipment is engineered for the job.

Originally, chemicals used in the manufacture of Climalene were received in 100-pound bags in box-car quantity. Unloading one car and delivery of the bags to the mixing room required the services of five men and consumed six man-hours of time. This did not include the subsequent time required to open the bags and dump the contents into the mixing bins.

Then, because of a production increase, Climalene switched over to bulk shipment, receiving the chemicals in 60-ton hopper cars—giving a substantial saving in bags and bag disposal. This presented an entirely new handling problem. Republic Materials Handling Engineers were contacted and helped work out a sift-proof, bulk-handling system that is both fast and economical.

This new system, built around the use of Republic Roll-Over Boxes, provides these cost-saving advantages:

(1) One man using Roll-Over Boxes can now unload a complete car in considerably less than half the man-hours required under the old system, providing a substantial yearly savings.

(2) When used in combination with fork trucks having revolving carriages the boxes can be rolled over and the contents dumped, thus saving several handling steps.

(3) Design and construction features of Republic Roll-Over Boxes permit tiering to any practical height, thereby saving floor space.

(4) Chemical loss caused by bag breakage is eliminated.

(5) The bag-disposal problem is eliminated.

What about your plant? Perhaps a specially engineered or standard unit could cut your costs or simplify an operation. Why not talk over your problem with a Republic Engineer? There's no obligation. Contact the nearest Republic Materials Handling Representative. Or send us the coupon.

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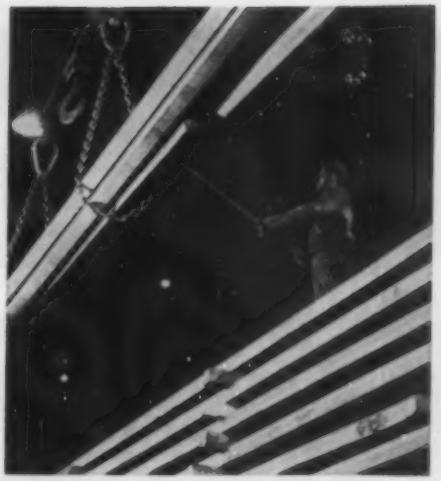
and Steel Products



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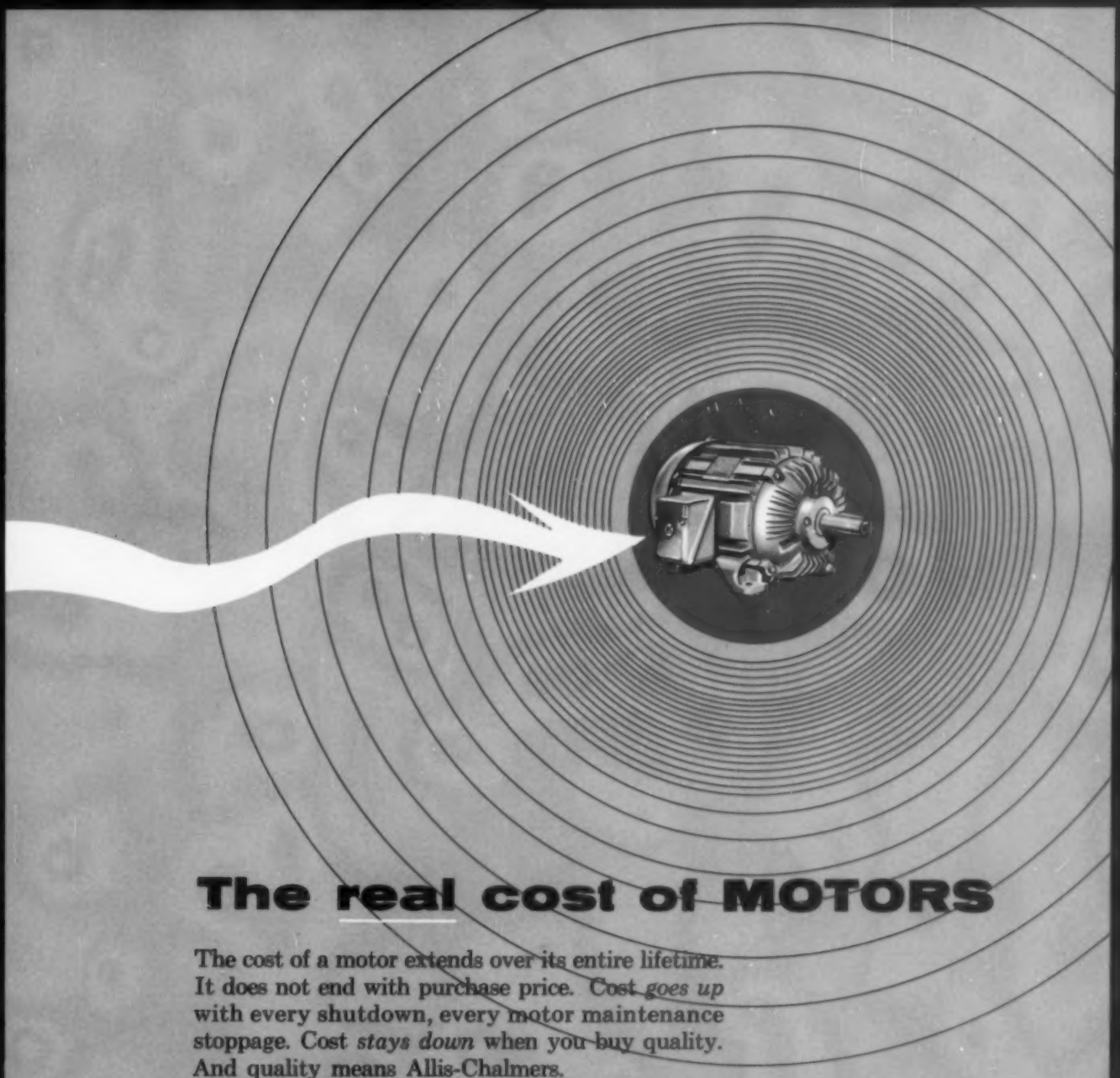


The real cost of MOTORS

The cost of a motor extends over its entire lifetime. It does not end with purchase price. Cost *goes up* with every shutdown, every motor maintenance stoppage. Cost *stays down* when you buy quality. And quality means Allis-Chalmers.

All of these extras that don't show on the Allis-Chalmers nameplate — more copper, more iron, more cooling provisions—exemplify the quality-craftsmanship that goes in before the price tag goes on.

For the "long run," either as a new machinery component or as replacement, specify Allis-Chalmers. Find out more about *real* quality in motors from your A-C district office or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

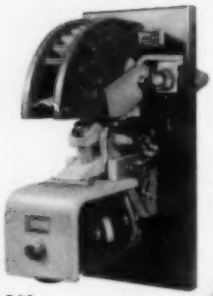
ALLIS-CHALMERS

A-C ALLIS-CHALMERS

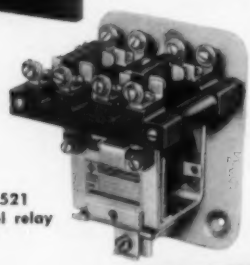
A-5287

The Difference in Control...

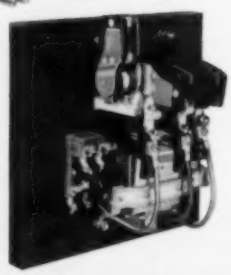
Constant potential dc mill auxiliaries for a 54-inch four-high temper mill.



Type 260
mill contactor



Type 521
dc control relay



Type 522
contactor

Advanced Engineering

...assures superior component selection
...construction detail
...performance

Basic circuit design for constant potential panels is relatively standard in steel mill applications. But, the engineer's choice of superior components and sturdy construction makes the important difference. The result — efficient, long and dependable operation, less maintenance — all proved by years of successful application in tough steel mill jobs.

Let us prove the difference in constant potential and variable voltage systems, and static or rotating regulators. Call your A-C representative, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

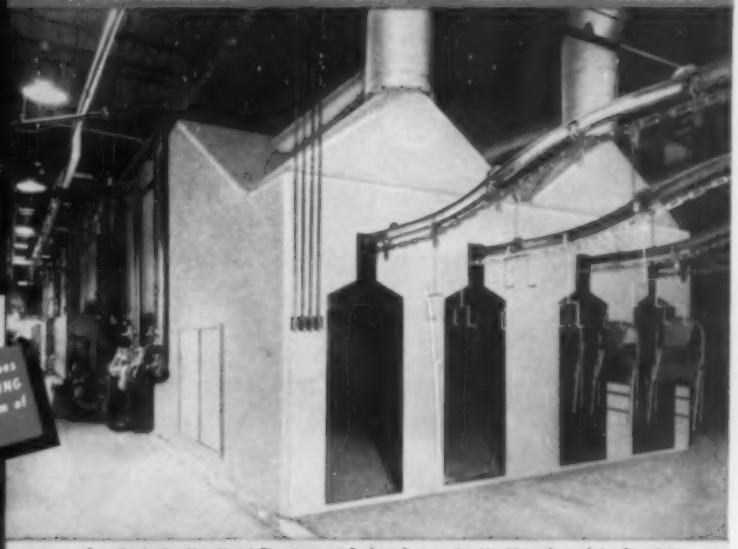
ALLIS-CHALMERS

A-5367

COMPLETE *Finishing* SYSTEMS

. . . for ENAMELS • LACQUER • PAINT • VARNISH

One of the Eight Mahon Ventilated, Circular Electro-Spray Enclosures Employed in the Four Separate Painting Facilities in this System. Note Provisions for Control of Air Movement.



Four-Production-Line Metal Cleaning and Surface Preparation Machine—Part of the Complete Mahon Finishing System in the Durham Manufacturing Corporation's Plant, Muncie, Indiana.

One of the Four Separate Painting Units in this System. Each of the Four Production Lines Passes through an Identical Arrangement —Two Electro-Spray Enclosures and Staggered Touch-up Booth.

Ramp-Tunnel to Finish Baking Oven on Roof. Both Ramp and Oven Accommodate Four Parallel Conveyor Lines in One Straight-through Pass. Equipment is Divided with Two Lines on Each Side. Either Side can be Operated Independently.

Complete NEW FINISHING SYSTEM Provides FLEXIBILITY and Greatly Increased PEAK PRODUCTION CAPACITY!

A new and highly efficient Mahon Finishing System at Durham Manufacturing Corporation, Muncie, Indiana, gives management needed flexibility and greatly increased maximum painting production capacity. Four parallel painting production lines pass through the entire system. The Metal Cleaning and Surface Preparation Equipment, Dry-Off Oven, Cooling Tunnel and Finish Baking Oven are designed to accommodate four parallel conveyor lines. Each of the four conveyor production lines passes through one of four separate painting equipment arrangements—each of which includes two circular electro-spray enclosures and a staggered, touch-up Spray Booth. The entire System is designed so that two of the painting production lines can be shut down—the processing equipment is divided for this purpose. An ultramodern Finishing System of this type provides a manufacturer like Durham with painting equipment which will meet peak production demands and still permit operation at 50% capacity with the same efficiency and economy. If you are contemplating new finishing equipment, you, too, will want to discuss methods, equipment requirements and possible production layouts with Mahon engineers . . . you'll find them better qualified to advise you, and better qualified to do the all-important planning, engineering and coordinating of equipment. See Sweet's Plant Engineering File for information, or write for Catalogue A-657.

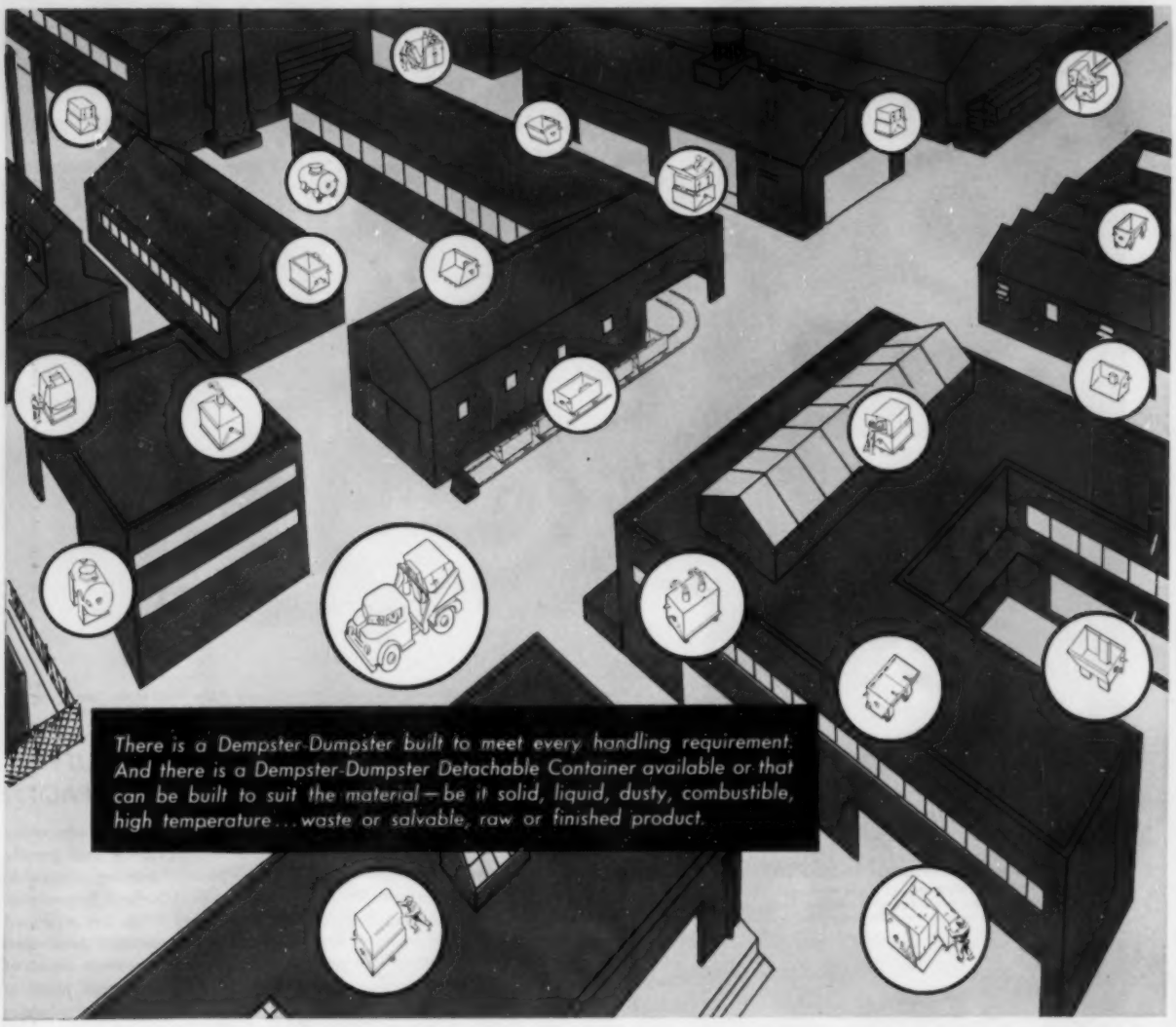
THE R. C. MAHON COMPANY • Detroit 34, Michigan

SALES-ENGINEERING OFFICES in DETROIT, NEW YORK and CHICAGO

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems, Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

MAHON

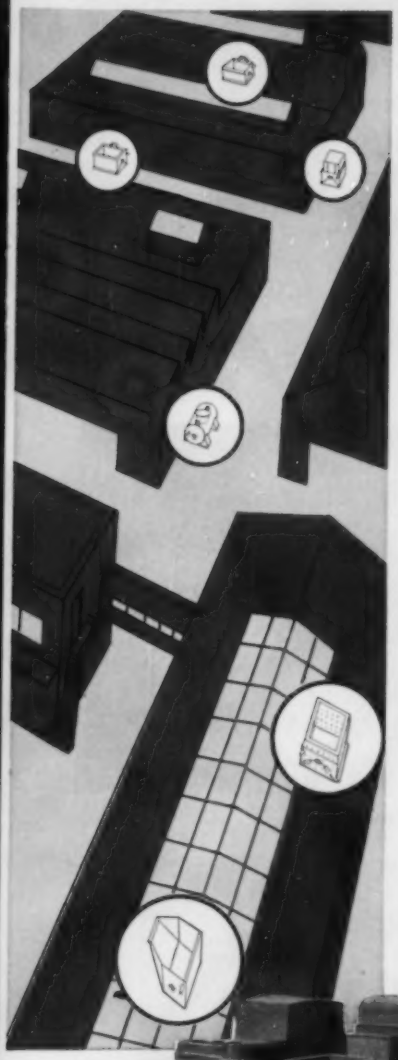
Who else wants to reduce materials


There is a Dempster-Dumpster built to meet every handling requirement. And there is a Dempster-Dumpster Detachable Container available or that can be built to suit the material—be it solid, liquid, dusty, combustible, high temperature... waste or salvable, raw or finished product.

With only one man, the driver, one Dempster - Dumpster serves scores of big detachable steel containers -- sizes 2 to 21 cu. yds... payloads up to 36,000 lbs!

SERVING COST-MINDED MANAGEMENT ALL OVER THE WORLD

handling cost 60% to 80% ? . . .



A FACT-FINDING SURVEY made by one of our engineers in cooperation with officials at one relatively small plant revealed labor cost of that firm's then-present-method was $6,552.00 annually. Labor cost would be $1,160.00 with the Dempster-Dumpster System — a saving of $5,392.00 annually (82 cents out of each $1.00). Investment in our equipment would amount to $10,000.00. In less than two years the equipment would pay for itself from its own savings produced for the user.

Results of a survey at a larger plant revealed annual labor cost amounted to $64,119.00, and would be $23,304.00 with the Dempster-Dumpster System — a saving of $40,815.00 (63 cents out of each $1.00). On an equipment investment of $40,968.00, the system would pay for itself in one year. In 5 years it would save this company over $200,000.00!

How much can this equipment save you? We recommend a fact-finding survey. No obligation, of course. It is the best way we have found to help you determine what can be expected of this system in your own particular operation. Or, perhaps you would prefer to first receive complete literature, free on request. May we hear from you? *Dempster Brothers, Inc.*

One Truck-Mounted
Dempster-Dumpster Handles Scores
of Containers... All Designs... All Sizes

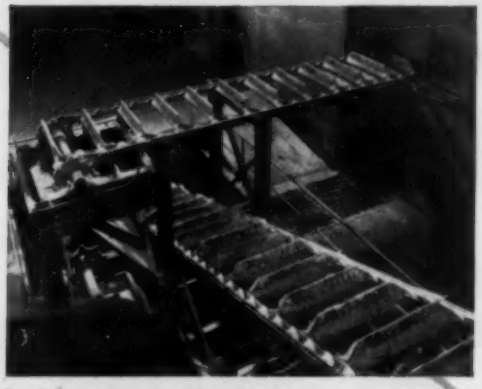
DEMPSTER BROTHERS 647 Dempster Building, Knoxville 17, Tenn.

by conveyor belts

by spiral conveyors

If you move materials

by bucket elevators



by scraper conveyors

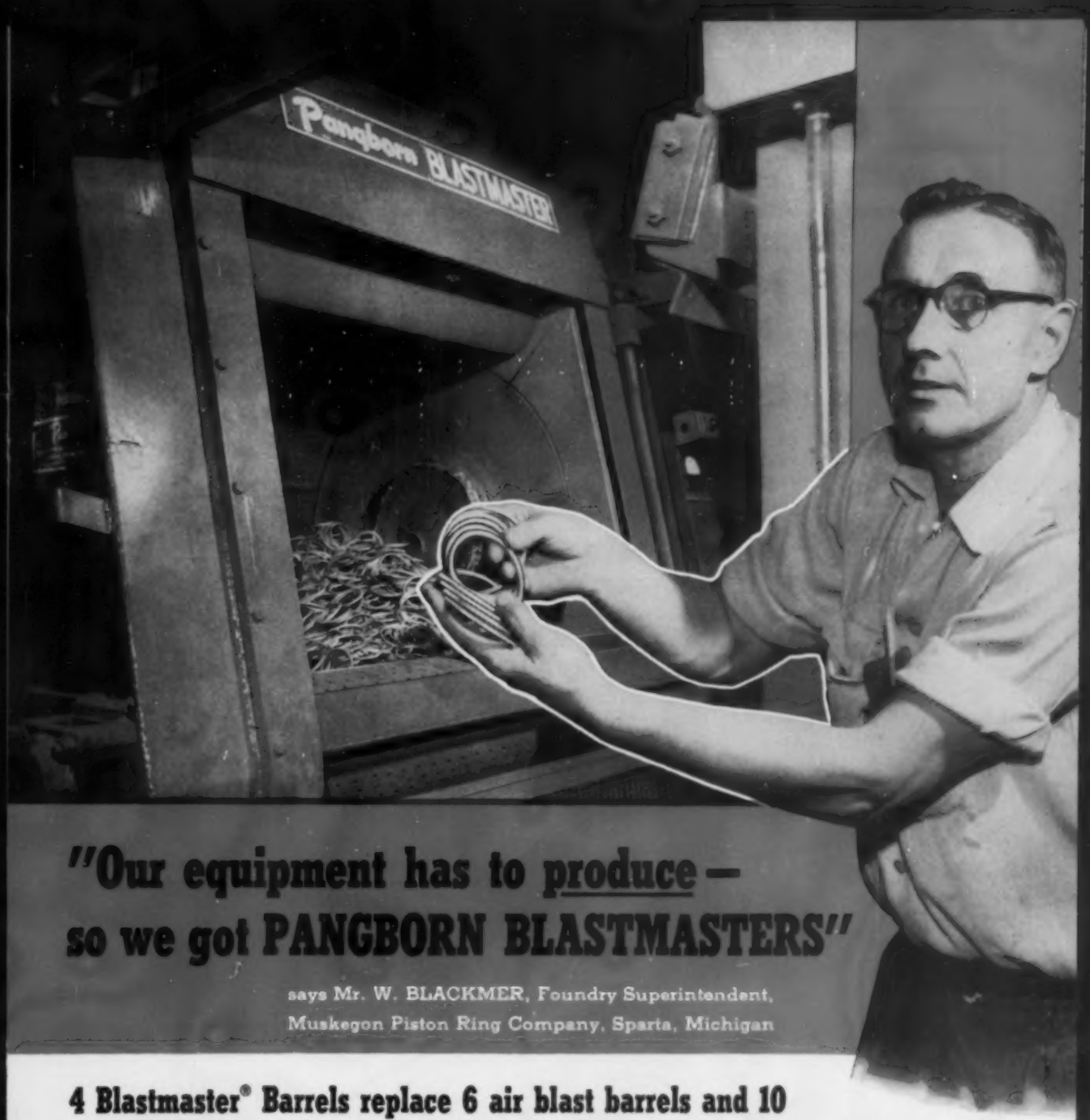
JEFFREY offers you

equipment incorporating the know-how gained in three-quarters of a century of studying and solving material-handling problems. Today, in thousands of plants throughout the world, Jeffrey conveying equipment is depended upon to maintain high production schedules, lighten the burden of labor and reduce operating costs.

Write for Catalog 860 describing Jeffrey material-handling and processing equipment. For high quality parts matching those originally installed on your equipment, get in touch with a nearby Jeffrey distributor or The Jeffrey Manufacturing Company, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING



"Our equipment has to produce — so we got PANGBORN BLASTMASTERS"

says Mr. W. BLACKMER, Foundry Superintendent,
Muskegon Piston Ring Company, Sparta, Michigan

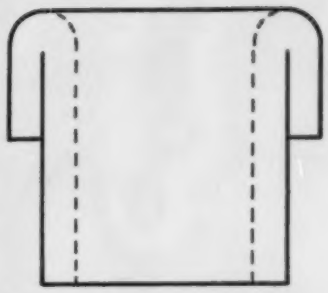
4 Blastmaster® Barrels replace 6 air blast barrels and 10 tumbling mills . . . cut two and three shifts a day to just one

"We maintain over 4,000,000 finished castings in stock for immediate shipment. To keep this stock replenished, our blast cleaning equipment has to really turn out the work. And we want a good job, too! We have found that our Pangborn Blastmasters fill the bill on both points—production per manhour is amazing."

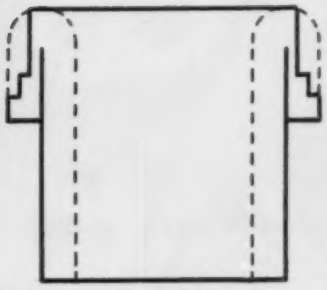
If *you* need blast cleaning equipment, look at all makes. Then check the Pangborn Blastmaster. You'll find it offers many exclusive features plus a choice of sizes to fit your needs—1½, 3, 6, 12, 18 and 27 cu. ft. Write for Bulletin 703 to PANGBORN CORP., 1600 Pangborn Blvd., Hagerstown, Maryland. *Manufacturers of Blast Cleaning and Dust Control Equipment.*

Pangborn blast cleans cheaper

more proof of *Carpenter* quality . . . at no extra cost



***Reverse bend* is made on one end, doubling the pipe back on itself.**



***Machining* is then performed on the doubled back part of the pipe as shown in photo.**

Carpenter Stainless Pipe shows fabrication savings!

Only the highest quality stainless pipe and tubing with outstanding uniformity in properties and dimensions can take this punishing reverse bend (see sketches) and succeeding machining operations. The part is made from 2″ Carpenter Schedule 40 pipe, and must meet close tolerance requirements consistently.

If more of this kind of proof is needed, call your nearest Carpenter Distributor today. He has the service and stock to serve you right!

MEMBER

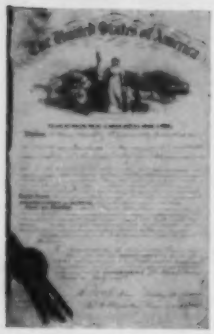
The Carpenter Steel Company
Alloy Tube Division, Union, N. J.

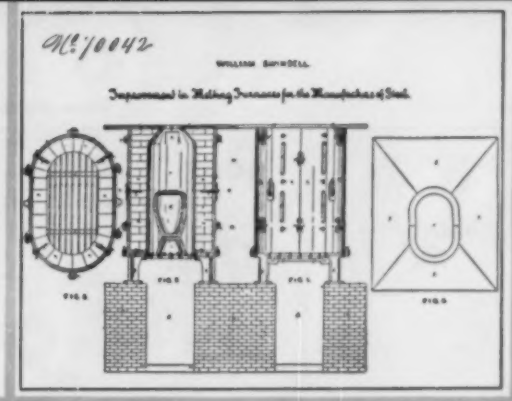
Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Carpenter

more than corrosion resistance

Stainless Tubing & Pipe





An early patent (No. 70,042 U.S. Patent Office) granted to Mr. William Swindell for an improved crucible furnace, for the melting of steel.

OVER 105 YEARS
... of knowing how

Today's SWINDELL Electric Melting Furnaces, employing the most advanced construction and operating features, reflect in their performance a continuity of steel-melting knowledge and experience extending over 105 years. In fact, a very large American steel producer has been our customer for 103 years. • *Knowing how* is one of the two great qualities in SWINDELL furnace production. The other is integrity. • Let us consult with you.

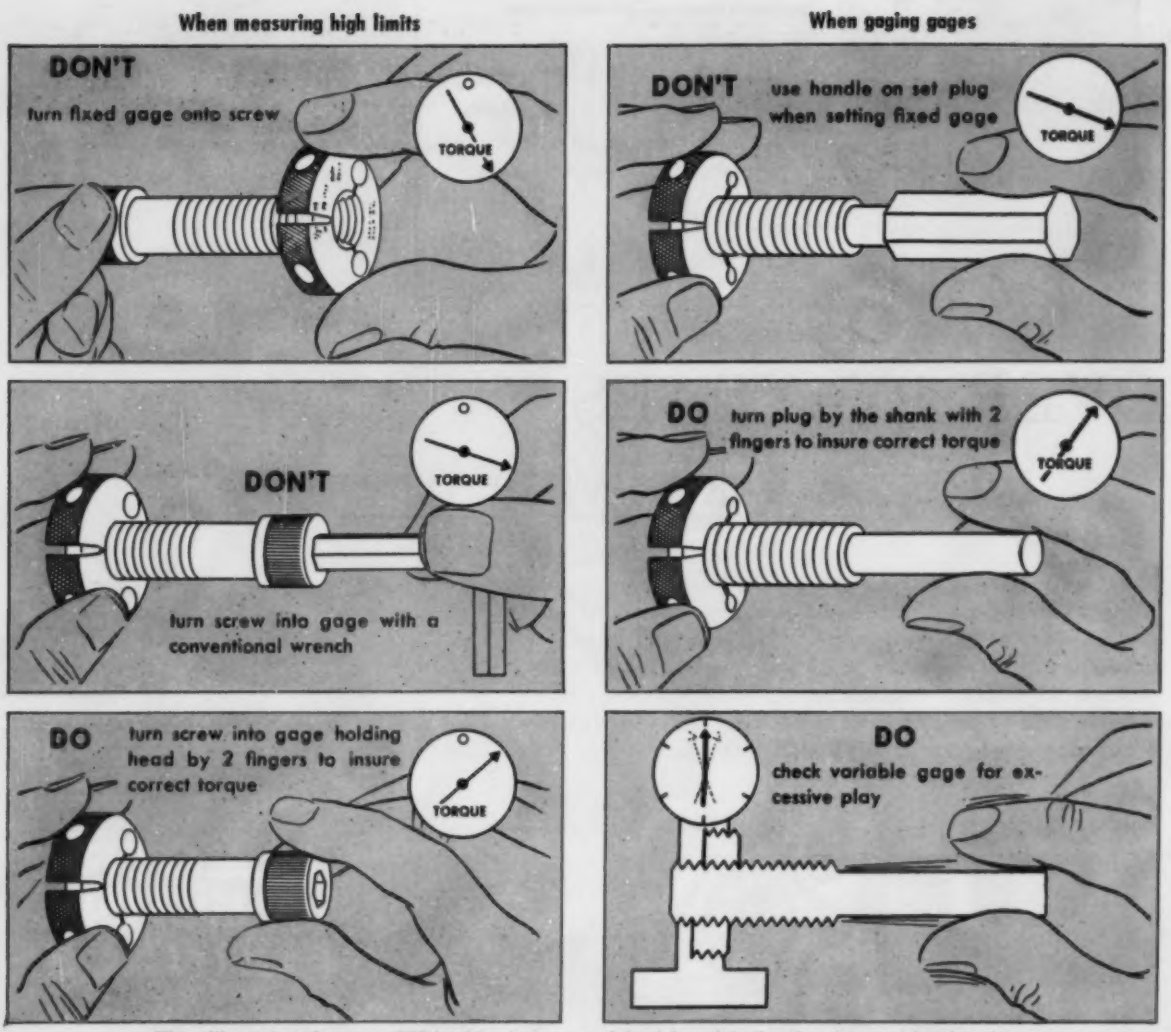
SWINDELL

ELECTRIC MELTING FURNACES

SWINDELL-DRESSLER CORP.

DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES

Pittsburgh, Pa.



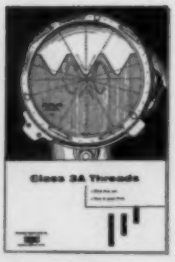
These illustrations from new SPS booklet show some of the do's and don'ts of gaging precision threads.

3A threads: what they are; how to gage them — new SPS booklet tells all

Threads made to Class 3A fit are the most precise in general use in industry. But you do not always get the 3A precision you specify. Because of many different gaging techniques that yield varying results, screws with threads well outside the Class 3A tolerance limits often pass inspection.

SPS has prepared a new booklet on this subject. It explains clearly what Class 3A threads are and the pros and cons involved in the widely varying gaging techniques in use today. It reviews the gaging of high and low limits of 3A threads, sampling techniques, and even the methods of gaging gages.

All standard UNBRAKO socket screw products fall within specified tolerance limits *no matter what method is used to gage them.* Leading industrial distributors carry complete stocks. Unbrako Socket Screw Division, STANDARD PRESSED STEEL Co., Jenkintown 33, Pa.



Form 2239, "Class 3A Threads: what they are; how to gage them." 16 pages, with many illustrations. Write for free copy today.

STANDARD PRESSED STEEL CO.

UNBRAKO SOCKET SCREW DIVISION SPS

JENKINTOWN PENNSYLVANIA

single stand reversing plate mill

BLAW-KNOX PLATE MILLS

Blaw-Knox designs and builds a full range of continuous or single stand reversing plate mills for rolling ferrous and non-ferrous slabs. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations including all auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron, and steel rolls, Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.

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Foundry and Mill Machinery Division
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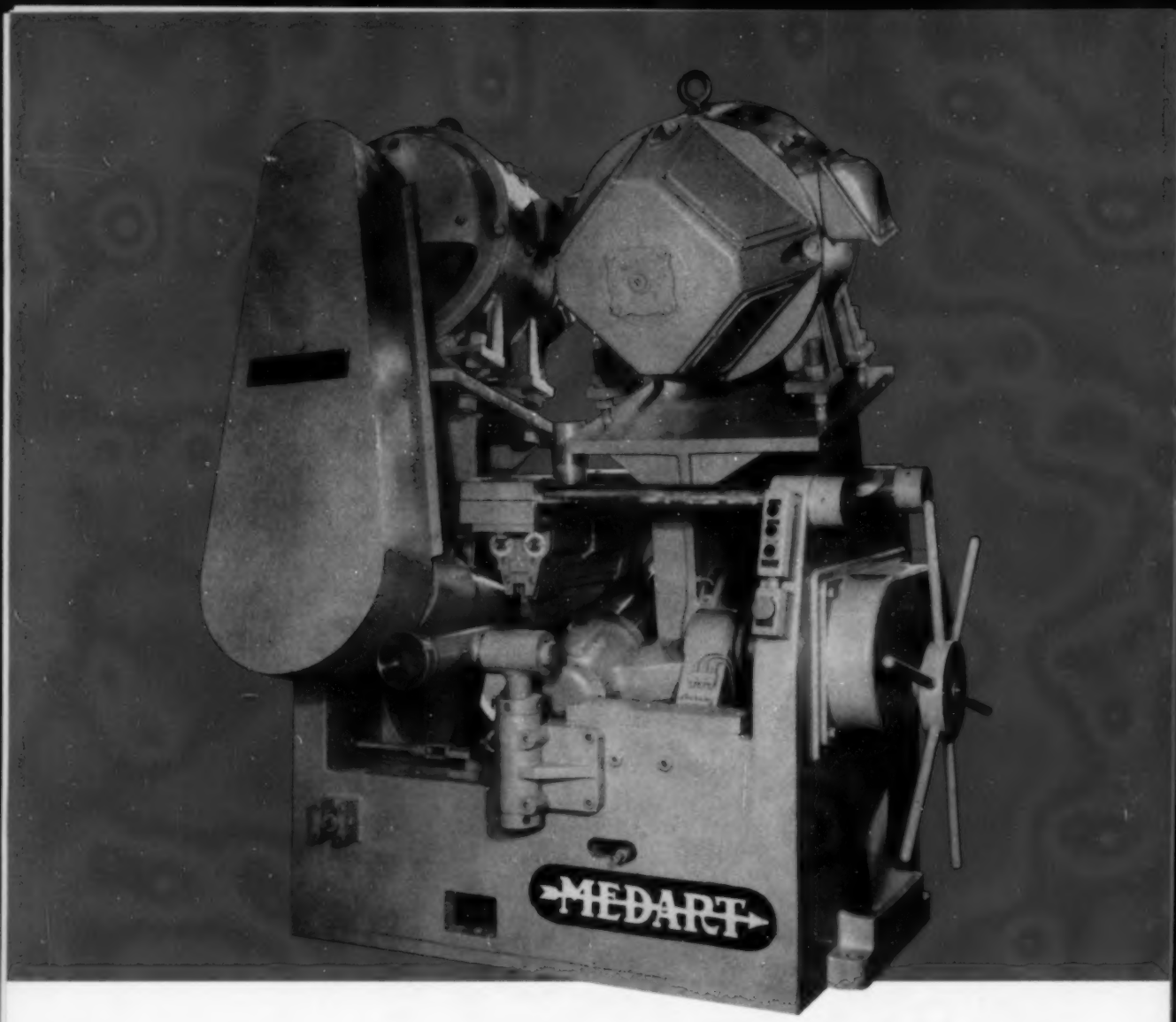

BLAW-KNOX MEDART makes what it takes

for high speed straightening of cold finished stock

Designed around the principle used in the famous Blaw-Knox Medart 2 roll Rotary Straightener, the 2 & 2 Universal Straightener is especially adapted for high speed applications. It is widely used in a direct production line with a draw bench for high speed straightening of cold drawn bars.

In this machine, each roll is driven by its own motor through a completely enclosed V-Belt drive. This simplified arrangement keeps downtime and drive maintenance to a minimum. What's more it provides for control of throughput rates by varying the speed of the motors. Roll speeds are synchronized by means of electrical interlocks between the motors.

Space requirements are kept to a minimum through compact design and the small number of working parts. This compact set-up simplifies discharge of work from the machine, making it ideally suited to shorter length workpieces.

The Blaw-Knox Medart 2 & 2 Universal Rotary Straightener and Polisher is available in sizes to handle bars and tubes in diameters of ⅛" to 4½". Contact us for detailed information, technical assistance or service.

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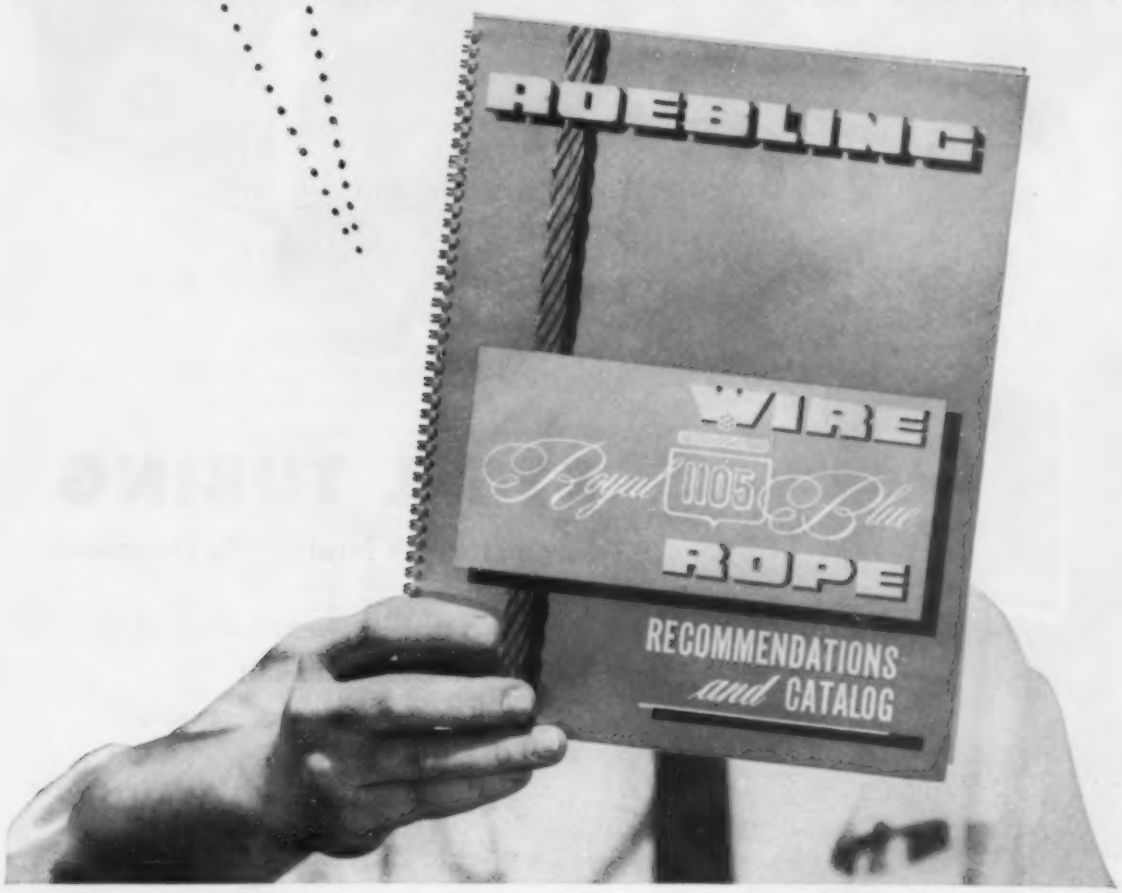
CONTINENTAL

"Use **wire rope?** Get this helpful **recommendations book!"**



"Roebling Wire Rope Recommendations and Catalog" is designed to simplify the selection and ordering of the right wire rope for specific applications—whatever they may be.

The best wire rope for top performance on any job shows up at a moment's notice . . . making the right choice is easy as flipping the tabbed pages of this easy-to-follow, 56-page book. Besides, there's a simple, foolproof, coded ordering system, which identifies the desired size, grade and construction.

May we send you your copy? Mailing the coupon will bring it to you at once. And should the catalog prompt any question on which you'd like further information, field men from your nearest Roebling office or distributor will, of course, assist you . . . or write Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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Branch Offices in Principal Cities · Subsidiary of The Colorado Fuel and Iron Corporation

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Wire Rope Division
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STEEL TUBING

large stocks • immediate shipment

- Seamless Mechanical
- Welded Mechanical
- Hydraulic Fluid Line Tubing
- Pump Cylinder Tubing
- Structural Tubing
- Stainless Steel Tubing

You'll get quick delivery on steel tubing for every purpose from Ryerson. The nation's largest tubing stocks —fast, accurate cutting service . . . and an experienced staff of tubing specialists—all are at your command.

So call Ryerson for everything in tubing and tubing service, whatever kind or quantity you need.

RYERSON STEEL

In stock: Bars, structurals, plates, sheets, tubing, alloy and stainless steel, reinforcing bars, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

STEEL

April 22, 1957

Metalworking Outlook

Wage Hikes Average 7.35 Cents

Negotiated wage increases granted so far this year are running slightly lower than those provided in contracts signed during the first 15 weeks of 1956. Some 51 settlements made since Jan. 1 in the bellwether northeastern Ohio area show a weighted increase of 7.35 cents per hour, excluding fringes, reports Associated Industries of Cleveland. For the corresponding period last year, the boost was 8.11 cents. Fringes most frequently negotiated this year are increased vacations, a seventh or eighth paid holiday, increased time off for death in the immediate family, higher sickness and accident insurance and more life insurance.

Experiment in Toledo Labor

Look for organized labor to experiment with all sorts of new demands this year to find a few potent ones for 1958. An interesting case concerns City Auto Stamping Co., Toledo, O., and the United Auto Workers. They agree on a plan to tie in severance pay benefits with Supplemental Unemployment Benefits. The plan provides for severance pay in cases of voluntary quitting, discharge, early retirement or death. Benefits will come from a special part of the SUB pool not to be used to pay layoff benefits. Management's obligations remain fixed at 5 cents per hour per employee. No maximum limit applies to the size of the fund. The amount of an individual benefit depends on the money in the fund and the worker's tenure.

Snag in Honeywell Engineers Election

The National Labor Relations Board failed in attempts to set up a "consent" representation election of Minneapolis-Honeywell Regulator Co. engineers and technicians. Both sides agreed to separate voting between engineers and technicians. The snag developed when the company demanded that students working part time also be permitted to vote. The UAW opposed the demand. An NLRB ruling will take weeks. Some union officials admit privately that the Beck affair is hurting the UAW's chances for winning this round, originally planned as the key in its drive for white-collar workers.

Record Coming for Handling Equipment

Material handling equipment sales in 1957 will exceed the 1956 levels, predicts the Material Handling Institute. January-February bookings indexed at 132.81 of the 1954 average, compared with 126 for the same 1956 period. Total average bookings for 1955 were 121.46.

AEC Under Fire

How the Atomic Energy Commission spends its money is being questioned by Congress. In dispute: Whether AEC must have specific authorization from Congress for electric power programs. Talk grows louder about breaking the AEC into two agencies—one for defense programs, one for the development of civilian atomic uses. Look for the public vs. private

Technical Outlook—p. 77 Market Outlook—p. 121

atomic power controversy to be aired this week as AEC's budget goes to the Senate.

Plastic Tooling Jumps 180 Per Cent

Watch for more plastic tooling. Nearly 14 million lb of plastics went into tooling last year, compared with 5 million lb in 1954. Epoxies account for almost 60 per cent of 1956 use, phenolics about 30 per cent. Other materials, principally polyesters and ethyl cellulose, made up the remainder.

Expansion at the Soo

The federal government will spend $103 million on improvements at the Soo locks over the next eight years. Most of the work is in anticipation of the St. Lawrence Seaway. Projects include deepening channels, building a railroad lift bridge and construction of a new lock to be named the "Poe."

Aircraft Sales Up, Profits Down

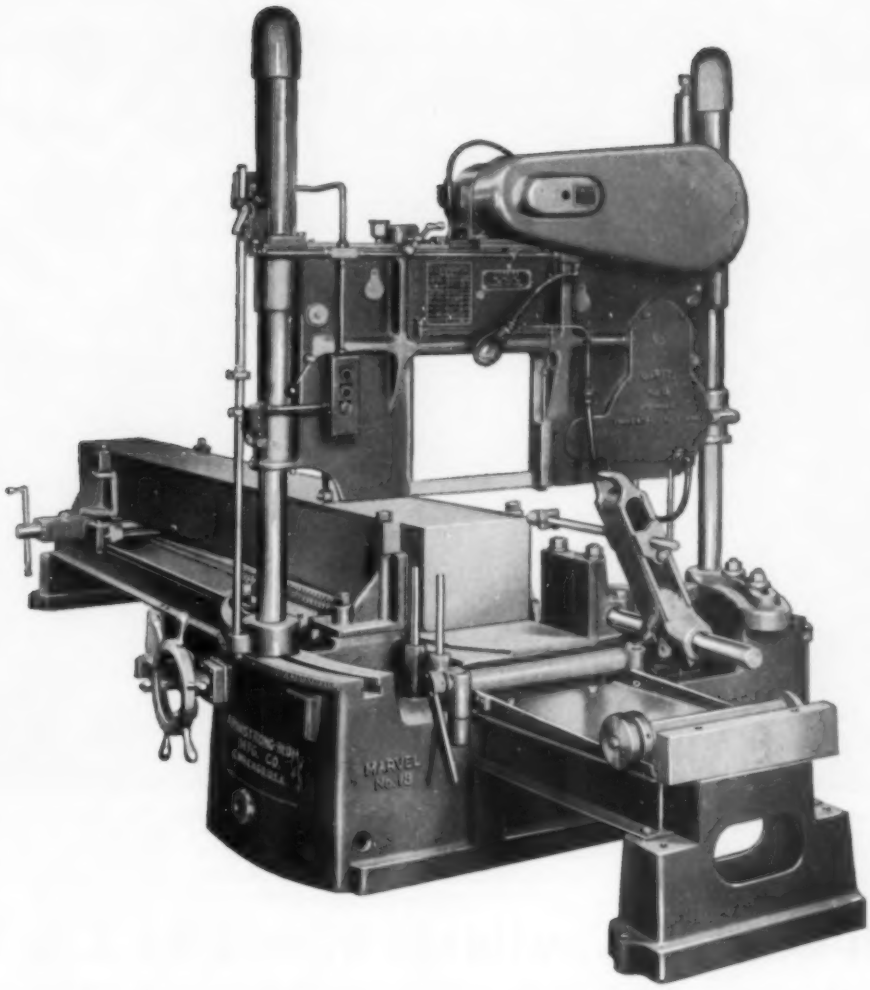
The nation's 12 largest airframe companies recorded a 9 per cent boost in sales last year, compared with 1955's, but after-tax earnings dropped 12 per cent, reports the Aircraft Industries Association. Sales totaled $5.6 billion; profits, $156.5 million. The firms continue to plow back about 60 per cent of their earnings into new facilities. That compares with an average 41 per cent of earnings reinvested by the 12 largest non-aircraft firms.

Top Ten Defense Contractors

The top ten firms in terms of the net value of military prime contracts awarded from January, 1955, to June, 1956: 1. North American Aviation Inc., $1341 million. 2. General Dynamics Corp., $1340 million. 3. United Aircraft Corp., $1274 million. 4. General Electric Co., $1051 million. 5. Boeing Airplane Co., $1061 million. 6. American Telephone & Telegraph Co., $747 million. 7. Ford Motor Co., $697 million. 8. Lockheed Aircraft Corp., $658 million. 9. Douglas Aircraft Co. Inc., $593 million. 10. McDonald Aircraft Corp., $522 million. Among the missing in the top ten: General Motors Corp., which ranks 14th.

Straws in the Wind

Best bet to succeed Dave Beck if he's deposed as International Brotherhood of Teamsters head is William A. Lee, an IBT vice president in Chicago, given a clean bill of health by the McClellan committee and favored by AFL-CIO President George Meany . . . The United Steelworkers of America has just issued a remarkably dispassionate booklet on its structure, services, salary scales and related matters; it's part of the drive to organize white-collar people . . . A Studebaker selling for less than $1800 will be introduced among 1958 models for Studebaker-Packard Corp. . . . Clevelanders this week will announce a sports car to be called Argonaut Type L.



No Job too big or too tough . . .

for MARVEL "*Giant*" Hack Saws

These giant MARVEL Hydraulic Hack Saws (No. 18, Capacity 18" x 18"; and No. 24, Capacity 24" x 24") were *basically* designed for rapid and economical cut-off of BIG WORK. They are not merely "conventional" designs "stretched" to big capacity. They are truly designed and built with the ruggedness and rigidity necessary to withstand the rough treatment of sawing big work, even though the work is in the "toughest of the tough" alloys.

They are reliably fulfilling the cut-off requirements in innumerable steel mills, forge shops, structural shops, warehouses, and machine shops, with assured low tool cost and minimum kerf loss of steel.

In addition to cutting-off, they are reducing costs by eliminating further machining operations. Heat treated die blocks are being reclaimed for re-sinking by sawing off the worn face; columns, beams, pipe, and tubing are being sawed to *finished*, square ends, eliminating milling; angular sawing is done conveniently by swinging the upper structure on the base, to any angle up to 45 degrees—*without moving the work*.

Contemplating the modern trend toward ever tougher steels and larger sizes, these are the logical sawing machines to buy, not only for today's needs but for tomorrow's as well.

Write for Catalog

MARVEL *Metal Cutting* SAWS
Better Machines—Better Blades

ARMSTRONG-BLUM MFG. CO. 5700 West Bloomingdale Avenue • Chicago 39, U.S.A.

Smashing scrap since 1953 . . . this 48" diameter, 16,770-lb. Ni-Hard drop ball is still going strong. Pays maximum return per dollar invested. High hardness helps lengthen its life. In addition, it is tougher than this hardness indicates. That's why it withstands the shock of jolts against scrap. Produced by United Engineering & Foundry Co., Pittsburgh, Pa.

Ni-Hard ball outlasts others by 3 to 1 ...breaks 27,000 tons of scrap and still on job

A Ni-Hard* drop ball earns you money because its resistance to abrasion greatly increases its life. Look at this one, for example . . . on an open hearth scrap drop at United States Steel Corporation's Youngstown District Works.

The ball looks battered, with one side slightly flattened out . . . but it should be after the service it has already given:

This Ni-Hard ball has broken up some 25 tons of scrap a day, seven days a week for more than three years.

Balls made of other materials averaged only 13½ months in the same service. Yet after 40 months the Ni-Hard ball is still in use. As a result of its unmatched resistance to abrasion, it still retains its working weight.

You'll profit by using a ball that stays hefty longer as it breaks up your scrap. So specify your next drop ball in Ni-Hard nickel-chromium white iron. A list of authorized producers is yours for the asking. Write for it now.

*Registered Trademark

Ni-Hard drop balls come in various sizes, and applications include fragmentation in reclaiming steel scrap from slag, breaking up cast iron scrap, powdering rock and the like. These drop balls were cast by United Engineering & Foundry Company.

INCO TRADE MARK **THE INTERNATIONAL NICKEL COMPANY, INC.** 67 Wall Street New York 5, N.Y.

Why Businesses Fail

Business failures are on the increase. This year, about 14,000 establishments of all kinds will cease operations following bankruptcy or similar difficulties. Fifty-three of every 10,000 enterprises will close their doors. The failure rate will be the highest since World War II.

The figures are sobering but not alarming. Since 1900, an average of 75 business of every 10,000 have failed annually. The failure rate in 38 of those years was higher than it will be in 1957.

Instead of stating that 53 of every 10,000 businesses will fail this year, we could say that 9947 will continue in business. We could also point out that while 14,000 establishments are folding, 147,000 new businesses will be starting. That's like reading the birth column instead of the obituaries.

While the failure rate is not overly serious on a national scale, it is darn serious to the owners, the employees and creditors of the businesses that fail. If you or a member of your family is sick, it's small solace to know that ten babies are being born as replacements.. You are looking for a more personal remedy.

A Dun & Bradstreet survey (see page 57) is helpful. It shows that managerial incompetence and lack or imbalance of experience in line and staff are the underlying causes of 91 per cent of all manufacturing industry failures. The owners and managers are inadequately prepared to operate a business. They become involved in inventory difficulties; they fail to collect their accounts; their fixed assets become excessive; their operating expense grows too heavy and their sales are inadequate.

So the illness suggests the medicine.

Managers should use the knowledge of why businesses fail as an antitoxin to immunize their own organizations.

They must be alert to acquire the skill and competence to handle modern-day business problems.

They must make sure that their key personnel in both line and staff have the experience and know-how to back them up.

Then we can be assured that the 9947 of every 10,000 businesses living through 1957 will continue strong and vigorous.

Walter J Campbell

EDITOR

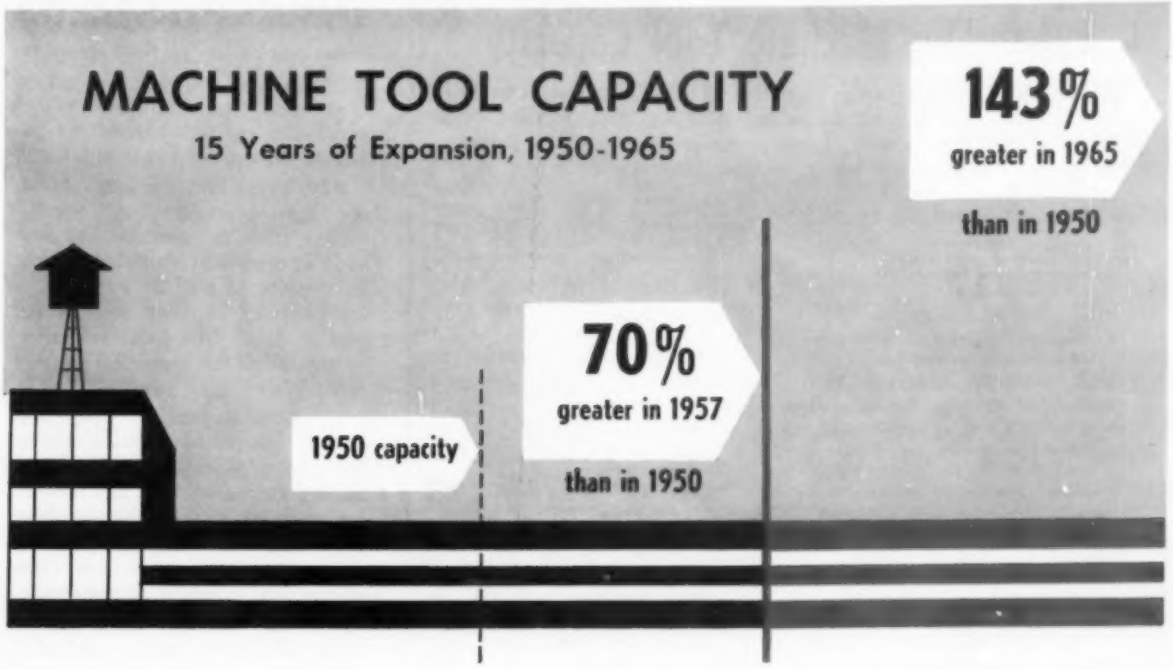
Which tin has the FrosTin*?

Manufacturers of "tin" cans have many customers whose products require great protection against corrosion on the inside of the can but less on the outside. Inland had provided this differentially-coated electrolytic tin plate which conserved tin resources and reduced costs, but a problem arose. Both sides were mirror-bright; can makers couldn't tell them apart. So, Inland researchers developed "FrosTin", tin plate with a frosty satin finish on the thinly coated side. Continuous product improvement is but one of the ways in which Inland serves steel users.

*T. M. Registered

INLAND STEEL COMPANY • 38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago • Milwaukee • St. Paul • Davenport • St. Louis • Kansas City • Indianapolis • Detroit • New York



Expansion in Machine Tools

Industry growth from 1950 to 1965 will parallel that of metalworking sales. Manufacturing area is up 29 per cent since 1950. Growth in capacity is greater

BY 1965, U.S. machine tool capacity may be 2.5 times what it was in 1950. A third of the companies responding to a STEEL survey say they plan to add to their physical plant size by the end of 1958. Expansion that surged during the Korean crisis shows no signs of tapering off in the next eight years.

As machine tool builders continue to boost their production capacity, they further obsolete the conception that the industry is tied to a boom-and-bust cycle. They also are writing finis to any lingering rumors of industry pessimism.

Pulse—To find out how the industry is growing, STEEL went to the builders. More than 100, representing a total 1957 capacity of just over $1 billion, responded. (At today's production pace, the figure also approximates shipments.) This group probably represents 70 per cent of peacetime capacity.

Their answers to STEEL's questions paint a picture of a healthy and growing industry.

Why?—How do builders explain the growth trend? At the annual meeting of the National Machine Tool Builders' Association last November, Louis Polk, president, Sheffield Corp., Dayton, and at that time association president, said: "In the past decade, the metalworking industries have doubled their physical volume of production. Reliable surveys predict that from these growing, higher plateaus, they will expand another full 20 per cent by 1960, and still another 20 per cent between 1960 and 1965.

"If America's production volume grows, machine tools grow because it is basic that any real production progress must be primarily created and sustained by machine tools."

In Proportion—Survey returns indicate that machine tool builders are gearing their industry for demand that's bound to come from the expanding economy. Their completed and planned expansion programs set a growth rate that is almost identical to that of metalworking and the economy as a whole.

Metalworking sales were $83 billion in 1950. This year they should hit $145 billion. In 1965, they should reach the $196 billion to $242 billion range in terms of constant dollars.

Floor Space — Respondents say they have added more than 3.3 million sq ft to their production floor space since 1950. That amounts to a 29 per cent gain. It accounts for much (but not all) of the capacity gain in the same period. Many builders cite capacity gains greater, percentagewise, than the new plants or additions that caused

Expanding Machine Tool Capacity

A THIRD of the companies reporting to STEEL say they'll probably spend about $16 million during 1957 and 1958 for 854,350 sq ft of new floor space. Some of these programs are nearly completed. Others are being contemplated.

Company	Square Footage To Be Added	Purpose
Abrasive Machine Tool Co. East Providence, R. I.	40,000	.....
Avey Drilling Machine Co., Covington, Ky.	45,000	Assembly
Axelson Mfg. Co., division of U. S. Industries Inc., Los Angeles	40,000	Assembly
Black & Decker Mfg. Co., Towson, Md.	58,000	.....
Blanchard Machine Co., Cambridge, Mass.	7,200	Assembly
Burg Tool Mfg. Co., Los Angeles	30,000	.....
Callahan Can Machine Co., division of Vermont Marble Co., Proctor, Vt.	15,000	Assembly
Crankshaft Machine Co., Jackson, Mich.	2,000	Stockroom, storage, engineering
Curtis Machine Division, Lincoln Park Industries Inc., Jamestown, N. Y.	25,000	.....
Giddings & Lewis Machine Tool Co. G&L & Hypro Divisions, Fond du Lac, Wis.	17,000	Assembly
Gisholt Machine Co., Madison, Wis.	50,000	Machining
Hammond Machinery Builders Inc. Kalamazoo, Mich.	30,000	Assembly, machining, shipping
Hartford Special Machinery Co. Hartford, Conn.	4,500	.....
Hill Acme Co., Cleveland	10,000	Foundry
Ingersoll Milling Machine Co., Rockford, Ill.	40,000	Machine shop
Jones & Lamson Machine Co., Springfield, Vt.	24,000	.....
Kaukauna Machine & Foundry Division, Giddings & Lewis Machine Tool Co., Kaukauna, Wis.	15,000	Pattern storage, assembly
Kempsmith Machine Co., Milwaukee	20,000	Machining
Kingsbury Machine Tool Corp., Keene, N. H.	2,700	.....
Lapointe Machine Tool Co., Hudson, Mass.	20,000	Machining, assembly
R. K. LeBlond Machine Tool Co., Cincinnati	11,250	.....
National Acme Co., Cleveland	60,000	.....
Onsrud Machine Works Inc., Chicago	3,200	Storage
Rogers Hydraulics Inc., Minneapolis	5,000	Assembly
Standard Electrical Tool Co., Cincinnati	6,000	.....
Stone Machinery Co. Inc., Manlius, N. Y.	5,000	.....
Sundstrand Machine Tool Co., Rockford, Ill.	50,000	.....
Sunnen Products Co., St. Louis	12,000	.....
Ty-Sa-Man Machine Co., Knoxville, Tenn.	5,000	Assembly, patterns
United States Drill Head Co., Cincinnati	16,000	Foundry, pattern shop
United States Electrical Tool Co., Cincinnati	6,000	.....
Van Norman Machine Co., Springfield, Mass.	50,000	.....
Warner & Swasey, Cleveland	90,000	Warehouse, machine shop, fabricating
Wiedemann Machine Co., Philadelphia	35,000	Engineering, manufacturing

them—proving the increased efficiency and productivity of the new facilities. In one case, a builder added 125 per cent in area with a new plant but boosted capacity 700 per cent.

Some companies have expansion programs for 1957 and 1958 under way. They will add nearly 900,000 sq ft. (See box above.)

Assembly areas are getting the most attention. Some, as in the case of Giddings & Lewis' G&L and Hypro divisions, Fond du Lac, Wis., will be high erection and assembly bays to handle the bigger machine tools now coming off drawing boards.

Even Spread—Today, there's a slight hint that larger companies are outexpanding small ones. The third of STEEL's respondents who cited plans for 1957-58 have just under one-half of all floor space reported.

For the long run, though, the expansion spreads across the industry evenly.

Both large and the small builders are operating on parallel planes. One, for example, has 3000 sq ft of manufacturing floor space; he expects to add 20 per cent to his capacity by 1960 and 30 per cent by 1965. His plans are exactly the same as those of another builder who now has 6000 sq ft.

Proposed expansion (and that already completed) applies both to builders of special machines and standards. Although it's becoming increasingly difficult to draw a sharp line between the two, a check of returns from both types of companies shows no substantial difference in their records or plans of growth.

People — As you would expect, this growth pattern is providing for more jobs in the industry. In those cases where a direct comparison could be made, the editors measured the growth in the number of production workers, engineers and salesmen.

For the 86 companies where comparisons were drawn, 8285 production employees have been added since 1950. In the same period, the cumulative sales force grew by 547 men and the engineering force gained 1001.

The relatively large addition to engineering staffs reflects interest in product improvement. It also shows the tremendous efforts most builders put into new designs for the 1955 machine tool shows.

Keep Pace — Jerome A. Raterman, president, Monarch Machine Tool Co., Sidney, O., and NMTBA president, says: "All indications point toward the continuing peacetime expansion of our economy. The nature of advances in technology and in the standard of living will play a major part in this expansion. It is imperative that the machine tool industry keep pace with such expectations."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Breakthrough for Steel?

Republic Steel and National Lead team up on new process for direct reduction of iron ore into high metallic content feed for steel furnaces. It's beyond pilot stage

THE ANSWER to a vital problem of the steel industry—reduction in expansion and production costs—may be wrapped up in a new business, the R-N Corp. (Its joint owners: Republic Steel Corp., Cleveland, and National Lead Co., New York.)

R-N Corp. will "conduct research on iron ores."

Research by National Lead in the separation of iron titanium from titaniferous ores led to the R-N process for direct reduction of iron ore to a high metallic feed for steel furnaces.

Piloted — Since 1954, a pilot plant at Republic's Spaulding mine near Birmingham has been producing the concentrate—enough is available for commercial testing.

R-N process iron is said to be primarily for metallurgical use, but its development may interest chemical and other industries. High grade feed for open hearth, electric or cupola furnaces is prepared in briquets weighing from 5 to 25 lb. Lower grade feed for blast furnaces is produced in peach seed briquets but can be made in larger size.

Need—Adm. Ben Moreell, chairman of Jones & Laughlin Steel Corp., Pittsburgh, recently said the steel industry badly needed "a technological breakthrough" to reduce the cost of steelmaking (STEEL, Apr. 8, p. 62).

Many firms have been conducting research along this line, seeking a process that would eliminate some of the steps in steelmaking and give them a hedge against rising scrap prices. Direct reduction of ore might lower the need for scrap and conceivably could lead to the elimination of pig in steel production.

Advantages—The R-N process produces a high metallic iron of uniform composition from a wide range of magnetic and nonmagnetic iron ores.

To produce the metallic, readily available, low-grade solid, carbonaceous fuels may be used regardless of coking properties or sulphur content. The process also rejects most of the phosphorus in the original ore.

Names of officers of the new firm were not announced nor was the location of its home office.

Mum—Neither Republic nor National Lead would discuss details of the process. But National Lead's interest in such research is indicated by a recent patent (U.S. 2,765,988) issued to Olav Mocklebust and assigned to National Lead. It describes a direct reduction process making concentrates suitable for steel furnaces.

Mixed with coal, the ore is partially reduced at 1112 to 2192°F for a metallic product which is 60 to 90 per cent iron. Crushing in a rod or bar mill flakes off the iron. A wet classifier separates the heavy iron fraction from the lighter which contains gangue and iron oxide.

A low magnetic separation reduces the iron flake to a product with a content of 90 per cent Fe and at least 80 per cent metallic iron.

Lukens Begins Major Expansion

Lukens Steel Co., Coatesville, Pa., will launch a two-year expansion program to boost its rated ingot capacity by nearly 25 per cent. The cost: $33 million.

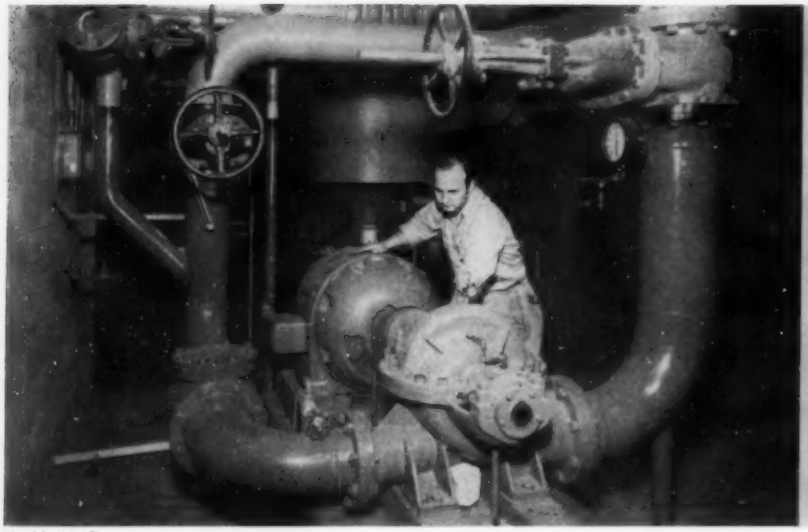
Billed as the biggest single expansion in the company's 147-year history, the program will increase capacity from 750,000 to 925,000 tons annually.

Major facilities to be added include an electric furnace and a 4-high, 140-in. breakdown mill to serve its 140 and 206-in. finishing mills. Also planned are new soaking pits, ingot storage space, technological improvement of present equipment and the relocation of related supporting facilities.

More than two-thirds of the cost will be financed by loans from customers. Earnings will provide the balance. By the end of 1958, the company will retire its outstanding long-term debt of $5.6 million.

Welding Special Steel for San Francisco Bridge

Workmen at United States Steel Corp.'s American Bridge Division, Ambridge, Pa., weld bridge members of USS T-1 steel. Over 2900 tons of this material will be used in weldments forming truss members and gusset plates for the new Carquinez Straits bridge at San Francisco. T-1 steel will resist stress of 90,000 psi—nearly triple that of structural carbon steel



Worthington Corp.

Industrial Pump Shipments
(Including parts and attachments)

	Millions of dollars
1957	481*
1956	465
1955	452
1954	388
1953	438
1952	413
1951	365
1947	225

*Estimated.

Pump Shipments Soar

Increased demand from oil and chemical industries is the major factor in upsurge. Compressor and pump makers expect 1957 to be record year; plan $25-million expansion

PUMP sales have doubled in the last ten years and should reach a new high of $481 million this year. The status of air and gas compressors is equally bright: Shipments stood at $139 million in 1947, rose to $285 million last year and should hit $293 million in 1957.

More—Those figures represent general industrial sales only. Counting other categories, shipments will exceed $1 billion this year. They include: Measuring and dispensing pumps (service and filling stations, $125 million); farm pumps (domestic water systems, $85 million); plus ice making, refrigeration, air conditioning and miscellaneous uses.

Rise—Most manufacturers cite increased business from the thriving oil and chemical industries as the major factor in rising pump sales, notably for centrifugal units. A. F. Welsh, Worthington Corp., Harrison, N.J., expects dollar volume of shipments to be up 8 to 10 per cent this year, with oil industry, chemical and paper mill pump requirements growing.

C. W. Lockhart, assistant manager, sales, Buffalo Pumps Inc., Buffalo, thinks sales will approximate 1956's. Probability: Increased demand from air conditioning firms added to the growing oil processing and chemical market. Centrifugal pumps account for the biggest part of Buffalo's sales.

Peerless Pump Division, Food Machinery & Chemical Corp., Los Angeles, expects a 10 per cent dollar volume increase in shipments this year with the greatest demand coming from the petroleum and chemical industries and municipalities. Centrifugal pumps will lead Peerless dollar shipments, followed by turbine and rotary.

Increased sales of centrifugal pumps to the chemical and petroleum industries will hold dollar shipments to at least 1956 levels, believes Kinney Mfg. Division, New York Air Brake Co., Boston. In unit sales, reciprocating pumps are second to centrifugal, with rotary third.

The chemical industry, with its increased demand for special pumps, is the best customer for Duriron Co. Inc., Dayton, O. Oil companies and paper mills are the next leading users. Most of Duriron's shipments to these industries consist of centrifugal pumps. Wayne Staley, sales vice president, expects an upswing in shipments of 5 to 7 per cent this year. Outlook: A 25 per cent hike in sales within the next few years.

Top—Rotary pumps lead in the number of units produced for industrial use by all manufacturers. Next come centrifugal, followed by reciprocating, turbine and vacuum. An estimated 1.35 million rotary units (100 psi and under in pressure; 10 gpm and under in capacity) will be assembled by manufacturers this year.

Total production of centrifugal pumps should hit 815,000 units in 1957 with dollar shipments of over $180 million. Demand is heaviest from the chemical and oil industries. Producers' backlogs are the largest in years with prospects for continued new volume bright.

Compressors—Exclusive of refrigeration, stationary air compressor shipments (7½-hp and under) for industrial use should hit

Shipments of Air and Gas Compressors
(Except refrigeration)

	Millions of dollars
1957	293*
1956	285
1955	252
1954	219
1953	265
1952	214
1951	202
1947	139

*Estimated.

the 150,000 unit mark this year. Estimated production of portable air compressors (180 cu ft and under free air per minute capacity) will be about 30,000 units.

Industrial compressor shipments, estimated at $293 million for 1957, do not include air conditioning, refrigeration and ice making, which is probably the largest growing consumer of small and fractional horsepower compressors.

Design—This year's major pump design changes include improved mechanical seals for higher pressures, notably for nuclear and power plant installations. "Continuous, rather than batch production, is the trend in chemical plant operations," says Duriron's Mr. Staley. "Higher pressures and improved mechanical seals with selection of materials to resist corrosion are major engineering developments."

New materials used in pump assembly include titanium and more alloys for stronger cases. Kinney, to meet corrosion-resistant requirements, is using more noncorrosive metals, including stainless, in the pumps it markets.

Growth—The pump and compressor industry comprises 500 firms employing 65,000. Expansion plans call for the industry to spend $25 million on new plants and equipment to meet the upsurge in orders.

Personalizing Open Houses

Monarch Machine's goal: To better acquaint employees with management, each other and company activities. Method: Tour in small groups, achieve personal touch

WHY have open house for employees? Cram 1100 of them, plus their families and friends, into your plant for an afternoon and what do you really accomplish?

Officials of Monarch Machine Tool Co., Sidney, O., asked those questions and others. They wanted an open house. But they also had a goal: To get employees better acquainted with management, each other and all phases of the company's activities.

The answer: A personalized program.

Method—The approach immediately meant two things. 1. Families and friends could not participate. 2. An atmosphere of individual attention called for small groups.

The first problem was timing. The plant was working two shifts, five days per week. Saturday was the only practical day.

Dining room facilities dictated the size of the group if a meal was to be served. (Monarch felt it was necessary.) The dining room holds about 90 persons. With 17 members of management and selected guides, it meant that 70 employees could be invited at a time.

Schedule—So the program would not drag over several months, President Jerome Raterman and his officials developed a schedule that provided for three groups each Saturday. It worked out like this: The first group arrived at 8 a.m. for breakfast, then started on the 3½-hour program. The second group came at 9:30 a.m. and was served lunch after the program. The third group, primarily employees from the second shift, came at 2:30 p.m., was served dinner after the tour. In this manner, the open house was completed in five Saturdays.

As much personal attention as possible was the keynote. Groups were selected alphabetically, regardless of where the individual worked. The only exception: If a group wound up with only one woman, shifts were made to get at least four or five.

R.S.V.P. — Personal invitations from President Raterman went to each individual at his home. Retirees living in the community were also invited. With the invitation

Here's Monarch Machine's Formula

- Mail individual invitations.
- Keep groups small and informal.
- Have employees describe their own divisions.
- Demonstrate operation of company's products.
- Emphasize operation of white-collar departments.
- Plan informal question and answer session with executives.
- Send each employee a group picture and a "thank you" letter.

was an outline of the program and a return reservation card to be answered by mail. The invitation also noted that if the employee couldn't make it on the date set, he would be invited again.

The program included: Introduction of the company officials; brief talk about the company and its business outlook by the president; a movie on the production of Monarch lathes (many employees saw themselves in the film); a tour of the plant; demonstration of Monarch equipment in action; question and answer period.

Before the tour, guides introduced themselves and asked each person to give his name and department. As the group passed through an area in which a group member worked, the guide asked the individual to help tell the story.

Because the plant was not in operation, the tour went quickly, and attention was concentrated upon the office and departments which most shop employees had never seen. Displays were set up to explain the functions of each division. (They led to a great number of questions.)

Twist—"One of the highlights," officials relate, "was the demonstration of Monarch machine tools in action. The employees had all helped build the equipment—few had ever seen it in operation. They were fascinated."

The question and answer period also proved valuable. Some people jotted questions on slips of paper provided for that purpose ahead of time; many were asked from the floor. Since all officials were there, queries were directed to the men who could provide the answers.

The final personal touch was a group picture which each individual received through the mail along with a letter from the president thanking him for attending.

How did the approach work out?

Worth—"It's difficult to evaluate because you're dealing with intangibles," says Mr. Raterman. "But I do know that a lot of Monarch people know more about the company than they did before. A lot more office people and executives met and talked with more shop people than ever before—and vice versa. We certainly achieved our goal."

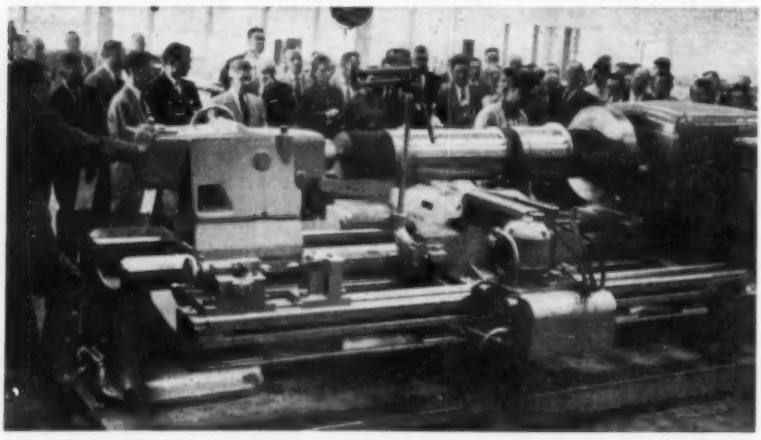
Woodward Strike Ends

The 162-day strike at the Woodward Iron Co., Birmingham, came to a close with the signing of a new labor contract.

Woodward says it will begin recalling its 2500 idled workers as soon as possible.

Terms have not been announced. The last company offer made public gave workers an hourly wage increase of 47½-cents (including welfare and other fringe benefits) over a three-year period.

Company officials estimate the strike cost workers more than $5 million in lost pay. The company lost over 300,000 tons of pig iron production during the walkout.



Monarch employees see their "handiwork" in operation

Economy Rides Crest

Manufactures steady as minerals jump. Durables and housing sag. Employment sets record

THE ECONOMY remains at a record level, latest Federal Reserve Board figures reveal.

The industrial production index for March (seasonally adjusted) held at 146 per cent of the 1947-49 average, the figure it hit in January and maintained through February. Manufactures stood at 147, while minerals jumped from 131 to 135 in February.

Durables—Durable manufactures dropped from 164 to 163, and consumer durables dropped from 137 to 134 in February. Biggest drop here was in autos: from 167 to 159. All major categories of industrial production and consumer durables ran ahead of March, 1956.

Construction—The value of new construction (seasonally adjusted) declined slightly in March, but the first quarter's annual rate of $44.8 billion was a record. The biggest sag was in housing starts. The annual rate of 880,000 units is the lowest since the spring of 1949.

Employment — Nonagricultural employment (seasonally adjusted) was a record 52 million in March. Unemployment ran 2.9 million.

Barium Plans To Divide

Barium Steel Corp., New York, is seeking the permission of its stockholders to divide into two separate corporations: Barium Steel Corp. and Republic Industrial Corp.

Under this plan, Barium would concentrate solely on the production and fabrication of basic steel and would include these companies: Phoenix Iron & Steel Co., Phoenix Bridge Co., Compania Dominicana de Minerales C. por A., and Chester Ore Carriers Corp.

Republic, a recently incorporated wholly owned subsidiary of Barium, would take over all the manufacturing and processing divisions. They include: Bayonne Bolt Corp., Clyde Iron Works Inc., Cuyahoga Spring Co., Erie Bolt & Nut Co., Geometric Stamping Co., Industrial Forge & Steel Inc., Wiley Mfg. Co.

Economy-minded Congress puts on squeeze as . . .

BDSA Fights Budget Cut

TWO potential pallbearers for the Business & Defense Services Administration showed up last week at the Senate Appropriations Subcommittee hearings on funds for that agency during fiscal 1958. They were the subcommittee chairman, Sen. Spessard L. Holland (Dem., Fla.), and Sen Margaret Chase Smith (Rep., Me.). Even though these hearings may go a long way toward deciding whether BDSA's industries' divisions stay alive, ten other committee members were absent.

Budget Cutters—Before the subcommittee was the House's cut of $3.6 million from BDSA's fiscal 1958 budget of $7 million. Previously, Commerce Secretary Sinclair Weeks had pleaded for restoration of $78.9 million of the $212.4 million cut from Commerce's total budget, including a restoration of $3.3 million in BDSA funds.

Frederick H. Mueller, assistant commerce secretary for domestic affairs, and Horace B. McCoy, BDSA administrator, cited the specific need for BDSA's industries' divisions. They spoke to the Senators about mobilization preparedness but were answered with such questions as: "How many public relations specialists does BDSA employ?" Conclusion: Congress's budget cutting mood appears to be a sincere one, at least in respect to minor appropriations that harm few constituents back home.

Call to Arms—Although BDSA spokesmen aren't admitting it, they're worried. While hearings were recessed until this week, private industry leaders are being called upon to write subcommittee members about the need for BDSA, and some will probably appear as witnesses before the subcommittee.

BDSA is getting backing from the administration, too. Defense Mobilizer Gordon Gray has written to Senator Holland and offered to be a witness. That takes some courage because Mr. Gray was just recently on Capitol Hill to fight for his own (Office of Defense Mobilization) budget. Some Congressmen may charge that he's spreading himself a little thin by fighting for too many budgets.

Single Agency?—The question in many minds: Is there a move to consolidate all mobilization efforts in the hands of one central agency? The Defense department has been accused of putting such an idea into the congressional mind. A top ODM spokesman disputes this, believing that Congress will prefer to continue the traditional separation of civilian and military preparations for any war.

A BDSA source comments that U.S. industry pays something like $25 billion in taxes a year and should be entitled to a voice in government. This has come to be one of BDSA's most important functions, particularly in the allocation of strategic materials to civilian needs in the face of military demands.

That argument, however, isn't slanted to appeal to Congressmen who have an idea that industry already has too much of a voice in government through the administration's appointments of business leaders to top positions. Behind all this, of course: Congress's open antagonism to the WOC program of BDSA's industries' divisions. (Experts assist the permanent staff without compensation for six months.)

If, If—What happens if the Senate upholds the House's position and virtually eliminates the industries' divisions? These programs would be stopped in their tracks, says an ODM insider: 1. Trigger tools. 2. Elephant tools. 3. Leasing of government tools for nondefense purposes. 4. Inventory of idle equipment owned by civil agencies of the government. 5. Surplus equipment review. 6. Reviews of government foreign tool purchases. 7. Uniform equipment leasing practices.

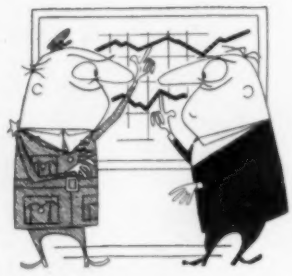
Other basic jobs of BDSA: 1. priority and allocation systems for Defense and the Atomic Energy Commission. 2. Stockpile requirements. 3. Analysis of mobilization potential. 4. Analysis of need for production expansions. 5. Rating of facilities on their importance to the defense effort.

Each program is essential to the preparedness effort, says ODM. If stopped, some other agency would have to take up the job. "It would be a mess to transfer the programs though, and the U.S. would lose its BDSA trained personnel in the process. Industry wouldn't know where to turn to find out what the government expects of it," an ODM official argues.

Another argument: Any new agency, or an old agency with new functions, wouldn't have the funds to carry out BDSA's job. All budgets which are connected with preparedness, except possibly, the defense budget itself, are getting the ax.

Consensus — "Our mobilization base is in danger of being destroyed by short-sighted budget cutting. We must have this nucleus of trained manpower on which to build a full war effort," concludes an ODM spokesman.

ODM Studies Cost Of Tool Rentals



GORDON Gray's first big decision as defense mobilizer should come within 30 days. He will decide how much the Defense department will charge private business for the rental of government owned machine tools.

Frozen Leases—While awaiting his decision, contracts which expire are running on a month-to-month basis at the old 1 per cent rate. The freeze was one of Dr. Arthur S. Flemming's last orders as outgoing defense mobilizer. He handed Mr. Gray a hot potato in this one.

The final report of the interagency task group on uniform equipment leasing practices is ready, except for Defense's views on rental charges. When they come in, Mr. Gray will choose between: 1. Charging rental fees amounting to $26,000 on a $10,000 tool over a period of 15 years. 2. Charging $16,000. Defense so far is holding out for the higher figure, which is about $9000 more than the average commercial rate. The $16,000 figure is the same or lower than all commercial rates, except for one firm's.

Until recently, the rent for such a tool has been about $27,000, so Defense has come down a little, but not nearly enough to satisfy some other agencies and Congressmen who have been receiving loud complaints from constituents.

Half of Profits—Example: A small New York company signed its original contract covering 30-odd tools during the Korean War. Its renewal rate (about 2 per cent) would boost its payments 85 per cent, even though the tools are older. The firm complained that the increase would take half its net profits after 1957 taxes. The Small Business Administration is documenting a series of such cases because a number of old contracts are about to expire.

It's difficult to guess how many firms are involved, but there are about 300,000 machine tools in government hands—about $3 billion worth. Many are not in use, and many which are don't involve direct rental charges. They're used under facilities contracts where the firm charges the government less for its products because it is allowed the free use of the tools.

Recommendations—Best guess of the government's machine tool rental business: Defense gets $24 million a year from 19,000 tools. That money goes into the Treasury department's general fund. One recommendation by the interagency task group: That the rental money be used to set up a revolving fund so that Defense can keep its tools up to date. Some would also like to see the free use of tools stopped. Small firms would favor such a move because they do most of the renting. Large corporations tend to get the facilities contracts.

Two Financial Studies Coming

Democrats will try to plow fertile ground this year for next year's congressional elections. Early in 1958, reports on the general economy will come from Sen. Harry Byrd's (Dem., Va.) Finance committee and from Rep. Wright Patman's (Dem., Tex.) Joint Economic committee. Between them, the committees will thoroughly air the administration's monetary policies. Consensus: If 1957 proves as good a year as 1956, the harvest (in congressional seats) will be slim.

Never Throw Away Anything

The General Services Administration offers a 56-page document to tell you what records you should keep if any of ten government executive departments or 16 independent agencies ever ask you for them. Record retention periods for about 600 types of data vary from six months to 60 years, says the GSA.

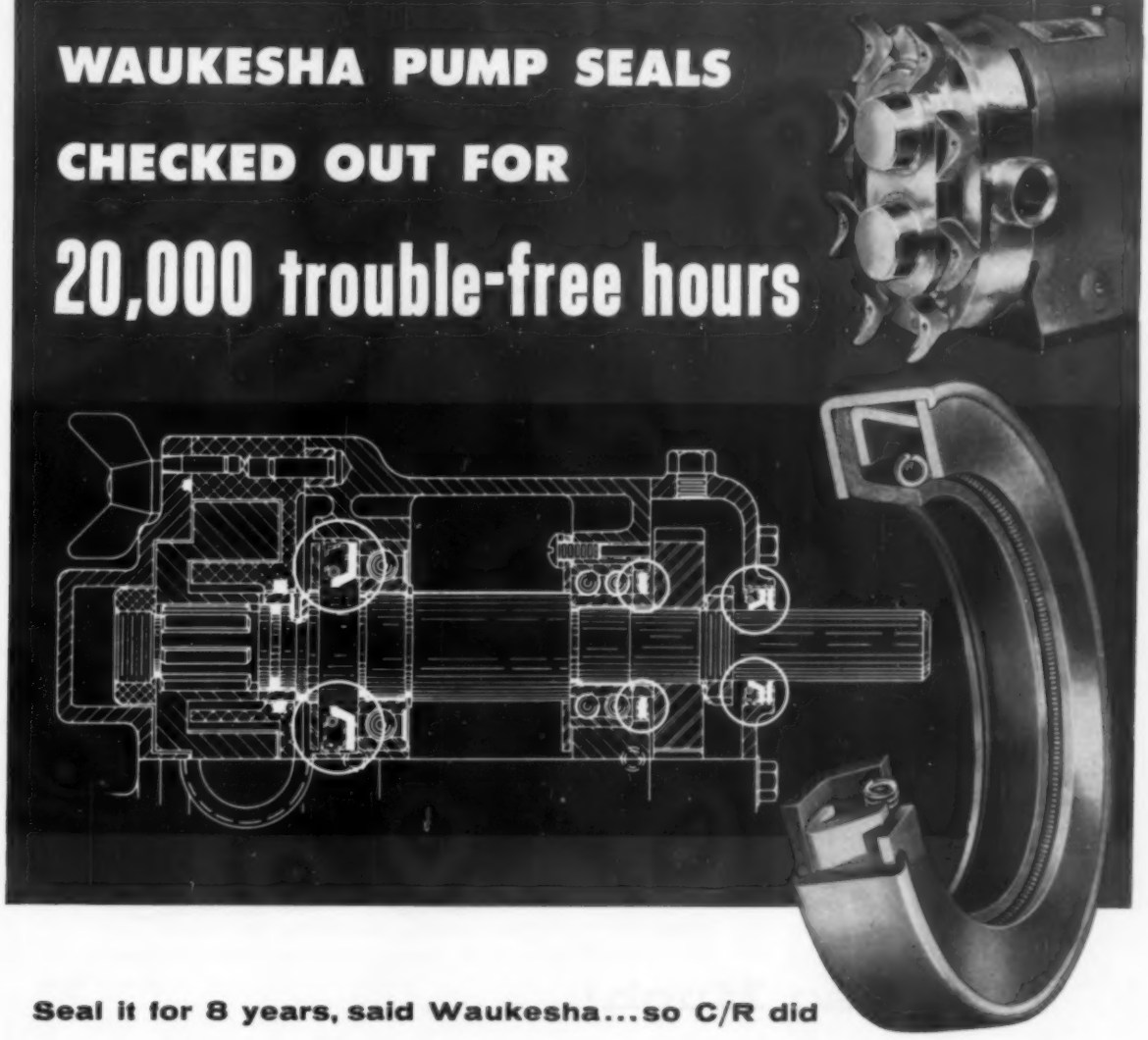
Outlook for West Coast Shipbuilding

With the House's cut of $91.5 million from the Maritime Administration's $94.5 million budget for fiscal 1958, watch for this move next year at appropriations time: Money for the rehabilitation of Pacific Coast shipyards. Congress excused its cut, pointing out that the Maritime Administration had $92 million left over from fiscal 1957. By next year, that money will be gone, and more will have to be voted. Western Congressmen are now lining themselves up for the big effort to wrench control of our maritime industry from the East Coast. They simply won't vote for funds if there's nothing for the West Coast in them.

Management Investigation

Next year, look for Sen. John L. McClellan's (Dem., Ark.) labor-management investigation to concentrate on the management side of the picture. That, plus passage of the Douglas-Murray-Ives Bill (STEEL, Apr. 15, p. 82) to force public disclosure of welfare and pension funds, would tend to take the heat off the labor movement in an election year. (The AFL-CIO, incidentally, favors the Douglas Bill.)

WAUKESHA PUMP SEALS CHECKED OUT FOR 20,000 trouble-free hours



Seal it for 8 years, said Waukesha...so C/R did

"And, we might add, we have had very, very few instances of failure with C/R Oil Seals," says Mr. Emil M. Howe, Vice President, Pump Division of the Waukesha Foundry Co. Long service life is only one of the requirements met by the C/R Types P, G and A Oil Seals in this Waukesha Sanitary Pump. They must seal effectively eight hours a day, six days a week for eight years . . . at shaft speeds up to 750 r.p.m., with pump head pressures up to 150 p.s.i., and temperatures ranging from 0° to 220° F., depending on the food material pumped. They also must resist food acids, and the acids and alkalies in the commercial detergents used to cleanse and flush the pump daily. An added indication of C/R Oil Seal dependability in the Waukesha Sanitary Pump is the fact that it constantly must meet rigid 3-A Sanitary Standards for the Dairy and Food Industries.

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U.S. To Exhibit in 18 Fairs

Lyon, France	International Trade Fair	Apr. 27-May 6
Tokyo, Japan	International Trade Fair	May 5-19
Casablanca, Morocco	12th International Trade Fair	May 4-19
Paris, France	46th International Trade Fair	May 25-June 10
Palermo, Italy	International Mediterranean Fair	May 25-June 10
Barcelona, Spain	25th International Samples Fair	June 1-20
Poznan, Poland	26th International Trade Fair	June 9-23
Izmir, Turkey	26th International Fair	Aug. 20-Sept. 20
Stockholm, Sweden	15th St. Erik's Fair	Aug. 31-Sept. 15
Salonika, Greece	22nd International Fair	Sept. 1-22
Bari, Italy	21st International Levant Fair	Sept. 7-25
Zagreb, Yugoslavia	International Trade Fair	Sept. 7-22
Vienna, Austria	International Autumn Fair	Sept. 8-15
Berlin, W. Germany	German Industries Exposition	Sept. 14-29
Marseilles, France	International Fair	Sept. 14-30
Tunis, Tunisia	5th Tunis International Fair	Oct. 19-Nov. 3
Rio de Janeiro, Brazil	Rio Industry & Commerce Exposition	Oct. 27-Jan. 26
Bogota, Colombia	International Fair	Nov. 22-Dec. 8

• The U.S. government will officially participate in 18 international trade fairs in 15 countries this spring, summer and fall.

"The international trade fair is an ideal market place for two-way trade and exchange of ideas," says Harrison T. McClung, director, Office of International Trade Fairs, Department of Commerce.

Trade missions of businessmen, exhibits and information booths will be used to explain the American way of life and the free enterprise system.

UK To Meet Own Steel Need

Britain plans $1440 million expenditure in five-year expansion program which includes new facilities; shipyards were hurt some by strike. They're booked ahead two years

THE BRITISH Iron & Steel Federation believes the United Kingdom's mills will be able to supply the nation's entire steel needs in five years. It looks for 26.8 million tons to be produced in 1958, twice the amount being turned out at the end of World War II.

Such a program will cost an estimated $280 million a year, or a total outlay of $1440 million by 1962. The federation warns that "steel prices must be adequate to cover expenditure on such a scale."

New Facility—As part of the expansion program, at least 14 new blast furnaces and eight new plate mills are planned. Additional coke ovens and ore preparation plants are in the offing, as well as modernization programs to increase production of existing facilities.

Although iron and steel imports have declined sharply during the last six months, the Board of Trade has suspended the import duty on plates another year. This indicates that British plate mills are not expected to meet home demand at least before 1958.

Full Blast — Most industrial plants are operating at full capacity. Producers of railroad cars and electrical equipment for the conversion of British railroads from steam to electricity are expanding.

Principal British automobile manufacturers are booking large export orders, especially for the smaller cars, and anticipate a rise in home consumption when Suez-imposed gasoline rationing ends. That's expected by June.

Not Hurt Badly — While the strikes sent some shipyard work to the continent, shipbuilders in Scotland and north England have orders enough to keep them busy for two years if enough plates are available. Steel interests did not suffer unduly, but there is feeling that the strike threat has not disappeared.

The shortage of plates is still a controlling factor in the shipbuilding rate, and users are looking for imports "at reasonable terms."

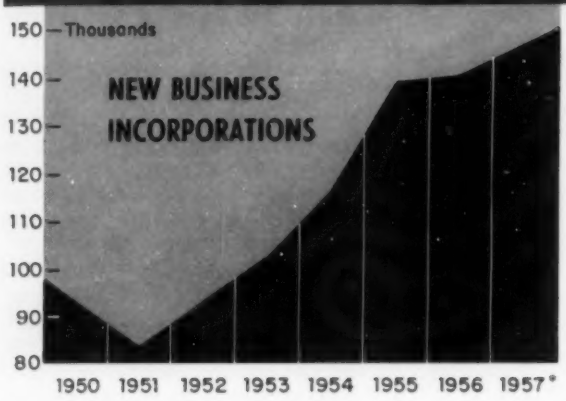
Steel Group Asks $35 Million

The European Coal & Steel Community is seeking $35 million on the U.S. public capital market—$10 million in medium-term bonds to be repaid in five years and $25 million repayable in 18 years.

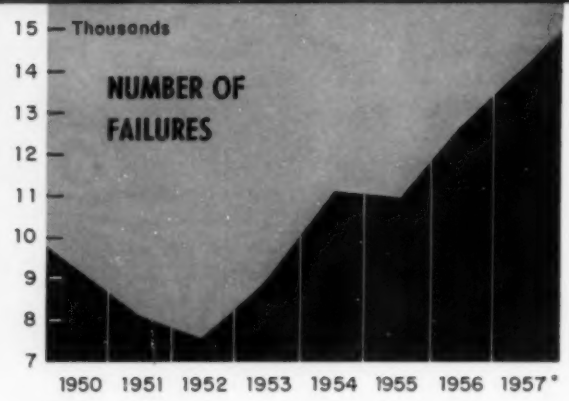
A New York group composed of Kuhn, Loeb & Co., First Boston Corp. and Lazard Freres & Co. is handling the loan. This is the first time the organization has made a public issue in the U.S. It received $100 million from the U.S. government through the Export-Import bank in 1954.

About $30 million has been borrowed in European currencies during ECSC's six-year existence.

As Incorporations Increase . . . More Businesses Fail .



*STEEL estimate.
Source: Dun & Bradstreet.



*STEEL estimate.
Source: Dun & Bradstreet.

Business Failures Mount

Construction and retailing head list of casualties. More older firms fall by the wayside as competition stiffens. Liabilities of failures are on the increase

BUSINESS failures are on the increase both in number and percentagewise (see charts above).

In the last five years commercial failures have risen 44 per cent among manufacturers, 60 per cent among wholesalers, 65 per cent among retailers, 66 per cent among service industries and 120 per cent among construction firms. In 1956, 12,686 companies folded. The figure is expected to climb to 14,000 this year.

Sunshine—But the situation is not as bleak as it looks. New incorporations are rising in proportion to companies going under (see chart above). They totaled 140,775 last year, should hit around 147,000 in 1957.

Also encouraging: More companies are doing business today than ever before. The number has been steadily going up since 1950 and exceeded 4.2 million last year. Estimate for 1957: Over 4.3 million by year end.

Villains—There's a doubled-barreled reason for the upswing in failures: 1. A shift in the economy. 2. Individual weaknesses.

Firms can't operate today as they did in the freewheeling war years and immediate postwar period. Reasons: 1. Competitive pressures from the climbing number of concerns going into business. 2. The ever-tightening cost-price squeeze in which all business is finding itself. 3. The ever-changing patterns in consumer demand.

Between 1940 and 1950, failures were abnormally low. Since then it has taken greater know-how to operate in our highly competitive economy. Major causes of failure fall into these categories (see box at bottom of page 57): Incompetence, unbalanced experience, lack of managerial experience, lack of experience in the line, fraud, neglect and disaster.

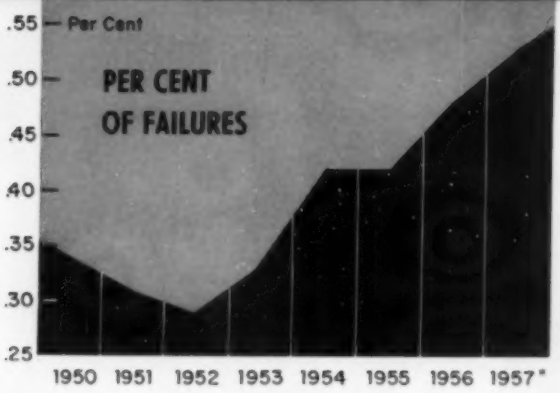
Take the case of a New England steel mill which folded recently. New interests bought it a few years ago and decided to spend several million to modernize it. Much of this capital was borrowed in the form of bonds. Stock was sold publicly. The modernization program was drawn out and costly. In the last two years, delays in getting into production were followed by operating losses of over $2 million. This caused working capital to fall below levels prescribed by the bondholders' indenture, and the trustee filed suit.

Healthy — Predictors of gloom cry that if failures keep snowballing they could head the economy straight into a depression, or at the least a serious recession. But Dun & Bradstreet points out that the 1956 failure rate per 10,000 concerns listed is less than half of what it was in 1929; one-third the 1932 rate; and slightly lower than the 1941 rate.

Some students of business failures go so far as to say the rising rate is a healthy sign—that our economy is shaking off the marginal operators and leaving a sound, solid business core.

Richard Sanzo, Dun & Bradstreet, New York, makes this analogy: "Failures remind me of a pear tree I own. It has become so big I can't spray it, so some of the fruit turns bad. Every year it is full of fruit until the first mild breeze, when some of the pears fall. Comes a stronger breeze and more pears drop. Then along comes a real September blow and I know the pears left are sound and I can harvest them."

. . . But Total Companies Go Up



*STEEL estimate.
Source: Dun & Bradstreet.

*STEEL estimate.
Source: U.S. Office of Business Economics.

Weak Spots—Here's where the failure rate has spiraled: Retail stores, lumber yards, building material retailers and construction firms. Major reasons: Owners siphon off too much of their profits, lack of buying skills and inexperience.

Take construction. In the last five years, the number of contractors and subcontractors has doubled. Many newcomers are artisans who know how to put up a house or commercial building but know little about the financial side of construction. Established contractors, with improved equipment and larger volume, drive down bid prices at a time when material costs are increasing. Many new firms can't compete and are forced out of business. But seniority alone is no guarantee of success.

Age—There is a definite trend toward more failures among older firms. Young firms are holding up surprisingly well. Last year, failures among companies in business five years or less were slightly higher percentagewise than they were in 1955, but the trend in this category since 1950 has been down.

From 1950 through 1954, firms in the six-to-ten year bracket had a slight uptrend in failures. But since 1954 this figure has dipped.

The change is most evident in the over-ten-year-old bracket. In 1947, this group accounted for only 9 per cent of all failures. In 1956, the figure rose to 18.3 per cent.

Why? As companies grow in size and age, the causes of failure shift. It's less a struggle for sales — more a matter of managing people and finances.

More Dollars—The amount of money firms owe when they go out of business is on the increase, too. While manufacturing and wholesale sales dollars climbed 18 per cent between 1952 and 1956, failure liabilities went up 98 per cent. In 1950, failure liabilities stood at $248 million. By 1956, they had gone up to $562 million.

Prevention—Management is becoming more and more concerned with ways to avoid failures. Consensus: There's no single golden rule. It's largely a matter of adhering to sound business principles, plugging up individual company weak spots and keeping pace with changing economic conditions.

As Mr. Sanzo puts it: "Some failures are always going to occur. Not every business is destined to succeed, any more than every college boy will become a corporation president. Perhaps we need just a little sickness once in a while to remind us that there are rules of good living."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Why They Failed

Reasons given by 1857 manufacturers

	Per cent
Incompetence	57.9
Unbalanced experience	15.2
Lack of managerial experience	9.6
Lack of experience in the line	8.2
Fraud	3.6
Neglect	3.4
Disaster	1.6
Unknown	0.5

Source: Dun & Bradstreet.

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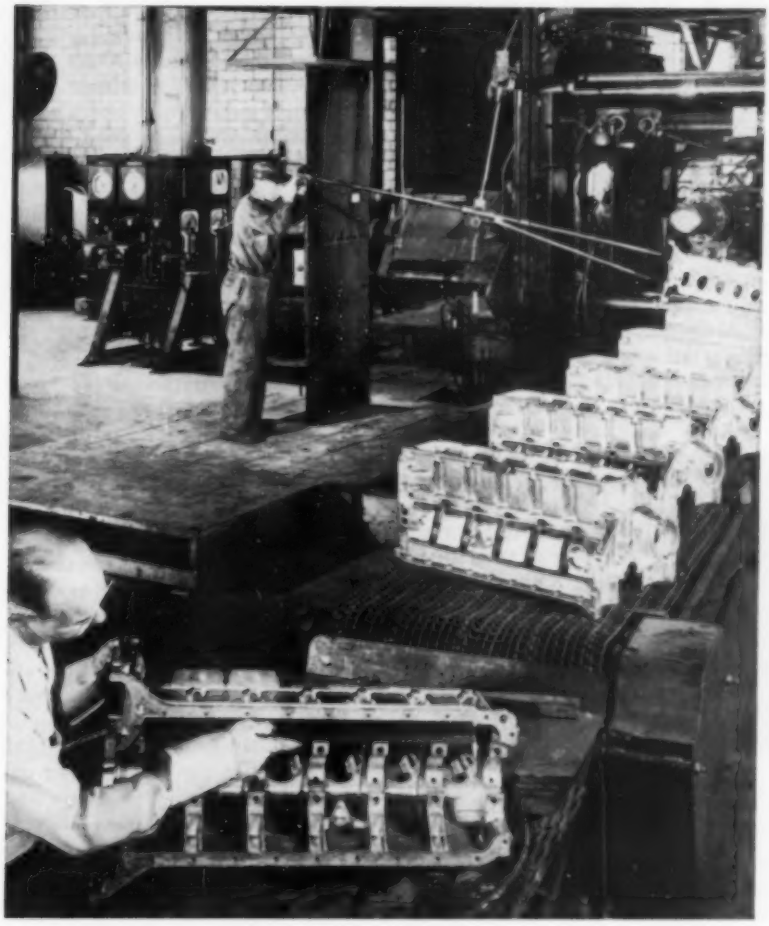

Diecast aluminum motor blocks on conveyor at Doehler-Jarvis plant, Toledo, O.

Aluminum Blocks by 1960?

ALUMINUM engine blocks are up for another look-see. The interest, this time, stems from an experimental V-8 engine General Motors has just patented.

It is mostly aluminum and magnesium, give or take a few alloy steel parts. The block is diecast aluminum and brings up the old question: "How far away from production is the aluminum block?"

Inevitable—Nobody doubts that the aluminum block, and subsequently an aluminum engine, are on the way. A. L. Boegehold, recently retired manager of GM's research staff activities, repeatedly has asserted: "Some form of diecast aluminum cylinder block will be the basis for reducing engine weight."

But up to now, there have been strong arguments against it. The biggest one is the amount of unamortized tooling in present engine facilities. Auto makers can't see spending millions for aluminum block casting setups until they get their money out of recently modernized foundries and engine assembly lines.

Old Dogs—Another problem has been the inability of old line design engineers to accept one basic premise: An aluminum engine has to be specially designed. You can't just substitute aluminum for gray iron in a block.

This has led to a raft of charges against lightweight blocks:

- The compressive strength of aluminum is lower than gray iron's.
- Aluminum has a higher coefficient of expansion.
- You can't cast an 8-cylinder aluminum block.
- Foundrymen maintain that aluminum costs more than gray iron.
- Another criticism: "Aluminum engines are noisy."

Defender—A. F. Bauer, chief engineer, Doehler-Jarvis Division, National Lead Co., Toledo, O., is the leading proponent of the aluminum block. He admits the charges are true if aluminum is considered only as a substitute for gray iron. But a properly designed block makes for a quiet engine and costs 10 per cent less to produce than its foundry counterpart, he declares.

Floater—The wet sleeve arrangement which has worked successfully for years in truck and aircraft engines also will work in a properly designed aluminum engine—particularly if the aluminum sleeves are coated with molybdenum.

Heads can be bolted down safely if thread depths are doubled, Mr. Bauer adds. In fact, some aluminum companies are experimenting with epoxy resins to bond heads to blocks.

Casting — Diecasting machines for V-8 blocks are available. Doehler - Jarvis has a 2000-ton caster that can turn out 40 blocks an hour.

Several sources report GM is introducing diecasting equipment into its Lima, O., foundry. Object: To compare sand and diecastings at close range.

Significance—GM's experimental engine means simply this: Auto makers apparently agree with Mr.

(Material in this department is protected by copyright, and its use in any form without permission is prohibited.)

Bauer and the aluminum companies that it takes a specially designed engine to do the job.

Patent brief No. 2781750 points out the engine will permit lower car profiles, something every stylist dreams about. The radiator surge tank is tucked between the cylinder heads. The crankcase can be 1 in. or less in depth.

Some engineers say power to weight ratios will be 4 or 5 to 1, possibly higher. The block weighs only about 50 lb. Total engine weight will be about 300 lb.

Extra Shove—Two other factors should help hasten the aluminum block: Recent long term molten metal contracts signed by Ford and GM with Reynolds Metals Co.

Secondly, a diecast block has none of the intricate twists and turns of a sand casting. It's made to order for automatic assembly operations.

Timing — When will aluminum blocks appear? It's an open secret in Detroit that GM and Ford have a dozen experimental jobs running around town now. Chrysler isn't far behind.

But present tooling has to be amortized—that will take three years at best. Kaiser Aluminum reports: "We don't look for it before 1962." Adds Mr. Bauer: "It will be at least three or four years before an aluminum block is introduced."

In either case, this means contracts should be placed in 1958 or the year after.

Debut? — It probably will appear first in a limited production model, most likely a sports car. Chevrolet's Corvette is a good bet. The experimental Corvette Super Sport, introduced last month, has an aluminum and magnesium frame. An aluminum engine is the next logical step.

Then, too, Chevrolet's Toledo transmission plant will be gaining necessary production experience since it's diecasting aluminum transmission housings. The step from a transmission housing to a block shouldn't be too difficult.

AMC — Another possibility is American Motors Corp. It's making lightweight aircraft engines for defense work. One thing the military would like is an aluminum block either for aircraft or for throwaway engines.

If AMC gets a go ahead for such defense development, it could lead directly to an aluminum engine for the Rambler or Metropolitan.

Chrysler Eyes Missiles?

There's an interesting rumor floating around Detroit that Chrysler Corp. wants to move further into the guided missile field.

North American Aviation Inc., Los Angeles, is "Mr. Big" in the business. It holds many prime contracts for missile development.

Airframes, engines and fuels are the vital components of missile manufacturing. Chrysler is in a nuts and bolts category supplying systems and parts. It could go into airframe building, but would have to get a closer tie in with a fuel supplier and engine builder.

Merger Talk—The original story has it that Chrysler is thinking of buying Reaction Motors Inc., Denville, N. J. RMI is one of the leading missile engine manufacturers.

RMI, however, denies any merger. It points out that 1956 sales were $16.1 million, compared with $7.5 million in 1955.

Another facet: 50 per cent of RMI's stock is owned by Olin Mathieson Chemical Corp., New York. That company is a leader in the solid propellant fuels used for missile operations.

Although RMI is not a subsidiary, the two firms do have close connections in development projects.

Even though the merger rumor is improbable, it seems likely that if Chrysler, Olin Mathieson and RMI could set up a working combination, they'd be in good shape to get some of their own prime defense contracts.

Talk has it that Uncle Sam wouldn't be adverse to seeing some healthy competition spring up in the missile business.

U.S. Auto Output

Passenger Only

	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
3 Mo. Total	1,792,013	1,742,934
April		547,617
May		471,617
June		430,373
July		448,876
August		402,575
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808
Week Ended	1957	1956
Mar. 16	141,038	131,207
Mar. 23	138,646	131,287
Mar. 30	130,233	125,850
Apr. 6	130,318	129,829
Apr. 13	127,382†	136,038
Apr. 20	127,000*	129,930

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

UAW Eyes Chrysler

Chrysler is in the missile business more ways than one these days. Currently, it's warding off wildcat strikes and brickbats being hurled by the UAW.

The latest development in the running fight has been the halting of all overtime operations in Chrysler Corp. plants. Further evidence of strife: The month-old strike at the Maywood, Calif., plant.

The overtime ban is a deliberate violation of the UAW-Chrysler contract.

Growls Norman Matthews, UAM vice president for the Chrysler department: "If they start yelling about contract violations on cutting out overtime, we'll give them a choice. Either do without overtime or we'll shut down the whole damn company!"

Although these strikes and several previous ones are in protest against Chrysler's tighter work standards, the current blows really are aimed as retaliation against what Detroit wags call "the March incident." (A corporation official indicated in a speech that the UAW had agreed to go along with changes in work standards in an effort to get the company back on its feet.)

As a result of the revised standards, some 20,000 men were reportedly laid off. Not all were rehired. Mr. Matthews and his chief, Walter Reuther, suddenly appeared to be in league with the corporate devil.

So it seems the union's vigorous denials and now the strikes are in the nature of face-saving.

Outlook—Chrysler isn't apt to readjust its work standards downward. It will be plagued by strikes all year.

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What makes Hyatts run smoother and longer?

CARBURIZED INNER RACES

From a fatigue life standpoint, the inner race is the critical member of a roller bearing, because the smaller area of contact between rollers and inner race concentrates the loads upon it. That's why HYATT goes to the added expense of *carburizing* every inner race—to assure you the performance and fitting advantages detailed at the right.

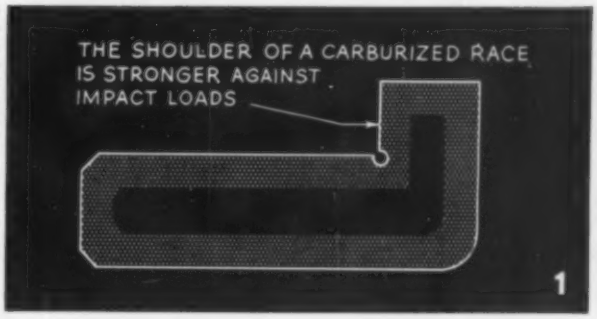
You will find full selection and application data in HYATT Catalog 150, or call your nearest HYATT Sales Engineer. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey. Sales offices at Harrison, Pittsburgh, Detroit, Chicago and Oakland, Cal.

HEAVIER INTERFERENCE FITS

Resistance to relative movement between inner race and shaft is vital to good performance. So HYATT makes practically all inner races of carburizing type nickel alloys instead of through-hardened steel. After carburizing and heat-treating, the outer surface has the hard wear resistance so necessary for an efficient bearing. The low-carbon core remains tough and ductile to permit much heavier interference fits than are otherwise possible.

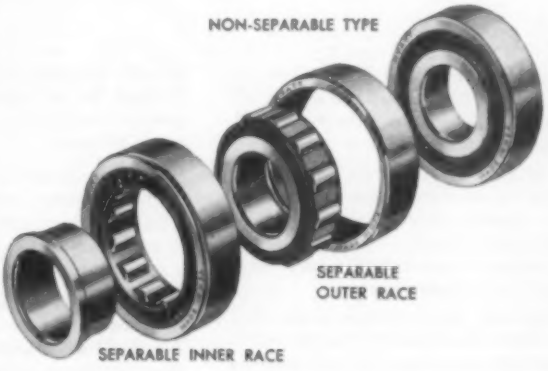
TOUGHER FLANGES, GREATER LOAD CAPACITY

Carburizing also enables HYATT to obtain substantially tougher inner race flanges. Tests show the shoulders will withstand considerably greater impact loads (Figure 1). The carburizing process has also been found to increase the load-carrying capacity of the race by building up compressive hoop stresses in its external fibres during quenching.



SIMPLER, LOWER-COST MOUNTING

Another advantage of HYATT'S heavier interference fits is the elimination of all auxiliary holding devices. When the carburized inner race is either pressed or shrunk on the shaft according to HYATT fitting recommendations, it becomes practically an integral part of the shaft itself. This permits mountings of the simplest type and lowest overall cost.



GM GENERAL MOTORS

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Naturally, the thousands of standard *nuts and bolts* that keep these powerful streamliners together *must* be absolutely reliable . . . *must* be strong, flawless.

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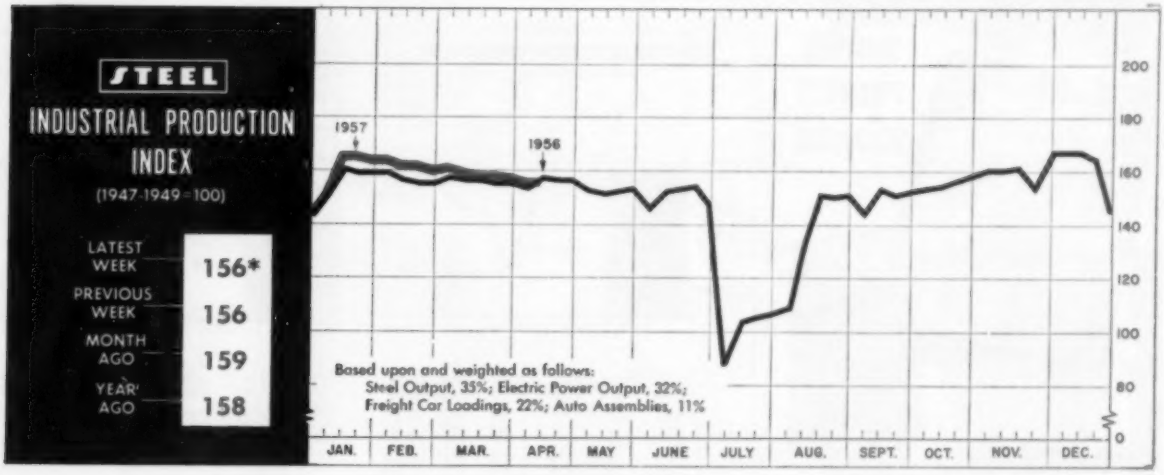

*Week ended Apr. 13.

Full Employment Still Bolsters Economy

EMPLOYMENT continues to be a main source for optimism in 1957 even though the number of factory workers declined in March for the third consecutive month.

March figures from the Commerce and Labor departments put both total civilian labor force and employment at record levels for the month. At 66,746,000, the labor force exceeds even the highest figure posted for any year prior to 1955 and is about 800,000 above the year-ago mark. More dramatic is the fact that total March *employment* of 63,865,000 tops the total *work force* for the same month just two years ago.

Projection—Few experts expect employment to increase to mid-year at the 1956 pace, although a recent study by the Department of Labor revealed that employers in 90 per cent of the nation's leading industrial centers expect to increase their payrolls through the middle of next month. The worst that could happen, barring a major recession, would be a 1957 high of 66.1 million, based on the 1954 rate of increase. The best would be about 67.5 million, based on the 1956 rate of growth.

Even in the manufacturing industry not all is gloom. The durable goods industries declined about 31,000 from February to March but still held a 28,000 edge over the year ago period. March factory employment at 16.9 million was 100,000 higher than it was a year ago. (For the metalworking picture, see chart, page 64.)

Less Hours, More Pay—Both the average work week (40.2 vs. 40.0 hours) and average weekly earnings ($82.41 vs. $82.00) declined from February to March. Over the year, the work week declined 0.4 hour, but weekly earnings rose by $3.22. Average hourly earnings in March remained at the February level of $2.05.

As over-all employment climbs during the second quarter, countertrends within manufacturing

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,297[1]	2,310	2,466
Electric Power Distributed (million kw-hr)	11,700[1]	11,693	10,918
Bituminous Coal Output (1000 tons)	8,345[1]	10,570	8,502
Petroleum Production (daily avg—1000 bbl)	7,650[1]	7,600	7,156
Construction Volume (*ENR*—millions)	$344.5	$281.5	$529.8
Auto, Truck Output, U. S., Canada (*Ward's*)	162,645[1]	165,126	174,558
TRADE			
Freight Car Loadings (1000 cars)	660[1]	644	742
Business Failures (Dun & Bradstreet)	231	290	217
Currency in Circulation (millions)[3]	$30,654[1]	$30,588	$30,300
Dept. Store Sales (changes from year ago)[3]	+9%	−8%	−15%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,618	$22,984	$20,479
Federal Gross Debt (billions)	$274.5	$274.9	$276.0
Bond Volume, NYSE (millions)	$23.9	$19.4	$23.8
Stocks Sales, NYSE (thousands of shares)	11,989	9,741	12,937
Loans and Investments (billions)[4]	$87.3	$85.6	$85.5
U. S. Govt. Obligations Held (billions)[4]	$26.6	$25.2	$27.9
PRICES			
STEEL's Finished Steel Price Index[5]	227.41	227.41	209.10
STEEL's Nonferrous Metal Price Index[6]	239.4	239.1	278.0
All Commodities[7]	117.2	117.0	113.4
Commodities Other Than Farm & Foods[7]	125.3	125.4	121.3

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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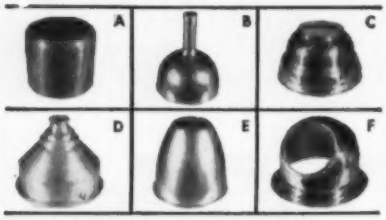
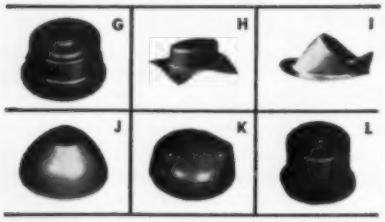


METAL SPINNING AND SPINFORMING:
Typical items: **A—Aircraft detail; B—Handle lamp; C—Lamp shade; D—Lamp base; E—Electronic cover; F—Compass cover.**



HYDROFORMING:
Typical items: **G—Appliance cover; H—Jet engine detail; I—Aircraft detail; J—Jet engine detail; K—Cleaner cover; L—Motor housing.**

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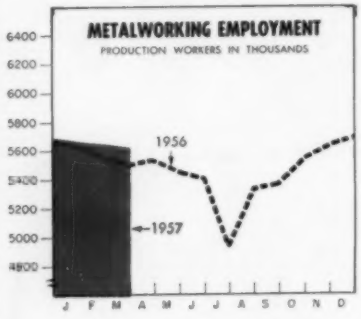
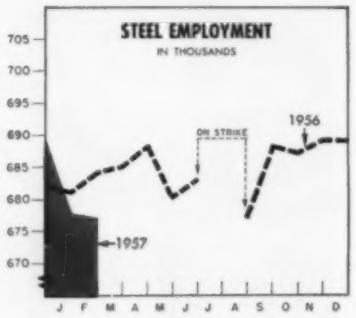
THE BUSINESS TREND





1956	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Mar.	1,130	893	1,281	842	1,354
Apr.	1,136	895	1,292	874	1,332
May	1,117	881	1,281	872	1,295
June	1,118	870	1,278	866	1,269
July	743	525	1,254	854	1,250
Aug.	1,091	864	1,257	878	1,235
Sept.	1,126	885	1,262	891	1,205
Oct.	1,132	911	1,264	914	1,319
Nov.	1,132	911	1,273	918	1,402
Dec.	1,133	909	1,289	907	1,439
1957					
Jan.	1,130	906	1,299	892	1,440
Feb.*	1,120	903	1,308	883	1,439
Mar.*	1,117	895	1,307	876	1,431

*Preliminary.
U.S. Bureau of Labor Statistics.

	Employment in Thousands 1957	1956	Payroll in Millions 1957	1956
Jan.	678	651	$360.4	$329.1
Feb.	677	684	327.5	317.3
Mar.	...	685	....	338.1
Apr.	...	688	....	326.7
May	...	690	....	333.6
June	...	683	....	332.4
July	...	n.a.	....	n.a.
Aug.	...	677	....	300.9
Sept.	...	688	....	339.0
Oct.	...	687	....	358.9
Nov.	...	689	....	346.0
Dec.	...	689	....	347.2

n.a.=not available because of strike.
American Iron & Steel Institute.

Charts copyright, 1957, STEEL.

will continue to get the headlines. Steel employment, for instance, will be lower in March and April than it was in February (see chart above). Appliance makers apparently are not ready to swing back into full production. Frigidaire Division of General Motors Corp. last week laid off 550 employees and worked its second consecutive four-day week because of high inventories and declining sales. Automotive layoffs may have halted for a while, but the elimination of overtime at Chrysler Corp. (under union pressure) will reduce the average work week and wages.

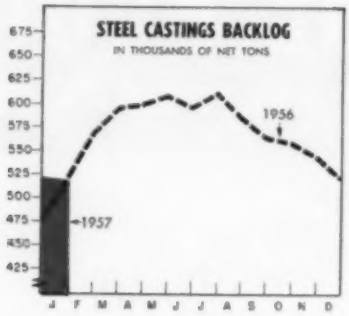
Counterbalance—The spring increase in outdoor activities will outweigh these cutbacks. Employment in contract construction rose about 70,000 in March and will continue the increase into summer. Agricultural employment this year is expected to be better than it was last year.

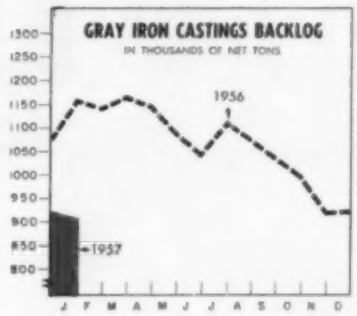
Despite the scattered weaknesses, total unemployment showed a seasonal decline to about 2.9 million. And "help wanted" ads in the newspapers are still as numerous as ever although most are for specific skills. The fact is, the "fullness" of our employment has not changed significantly over the last year.

Index Fails Test

For the first time in 1957, STEEL's industrial production index trend line fell below the year-ago mark during the week ended Apr. 13. It registered a preliminary 156 (1947-1949=100), 2 points off the 1956 pace. Three of the four components were beneath the performances of a year ago as follows (1957 estimate first): Steel output, 2,328,000 net tons vs. 2,483,000; auto and truck output, 150,517 units vs. 160,280; freight car loadings, 660,000 cars vs. 742,053. Only electric power output remained ahead of the corresponding 1956 figure, 11.7 billion kw-hr vs. 10.918 billion.

Chances of an immediate upturn are not good, with the prospect of a sub-1956 line for another week or two. Steel operations for the week ended Apr. 21 were estimated at under 2.3 million tons by the American Iron & Steel Institute, equal to 89.7 per cent of capacity. This marks the first time since the recovery from the steel strike that the operating rate has dropped beneath 90 per cent of capacity.





	Shipments 1957	Shipments 1956	Unfilled Orders* 1957	Unfilled Orders* 1956
Jan.	169.2	158.7	519.6	519.4
Feb.	....	165.4	....	567.3
Mar.	....	170.0	....	595.0
Apr.	....	163.7	....	600.2
May	....	178.2	....	608.3
June	....	164.7	....	597.1
July	....	118.0	....	611.2
Aug.	....	160.0	....	556.5
Sept.	....	155.0	....	563.0
Oct.	....	175.6	....	558.5
Nov.	....	164.1	....	545.9
Dec.	....	158.7	....	521.8

*For sale. U.S. Bureau of the Census.

	Shipments 1957	Shipments 1956	Unfilled Orders* 1957	Unfilled Orders* 1956
Jan.	1,216	1,250	906	1,158
Feb.	....	1,215	....	1,141
Mar.	....	1,255	....	1,163
Apr.	....	1,218	....	1,145
May	....	1,236	....	1,086
June	....	1,152	....	1,041
July	....	763	....	1,109
Aug.	....	1,103	....	1,074
Sept.	....	1,110	....	1,037
Oct.	....	1,275	....	996
Nov.	....	1,178	....	917
Dec.	....	1,109	....	920
Total	....	13,862		

*For sale. U.S. Bureau of the Census.

The immediate hope for an upturn in auto output was quashed when all of Chrysler's divisions were forced to eliminate overtime. A successful selling campaign this spring would still boost schedules, but time is running out, and the traditional pattern is far from being realized.

Freight car loadings are lagging farther behind the year-ago cumulative totals as each week goes by. Except for the week ended Apr. 6, when the coal miners took a holiday, coal loadings have been improving over recent weeks. The largest category, miscellaneous (it includes most metalworking products), is the weakest element in the Association of American Railroads' listing.

The only real bright spot in the index is electric power output. It is holding to its gains of about 6 to 8 per cent over year-ago figures, a pattern that has been going on since Reddy Kilowatt was just a little spark.

Price Rise Halts

For the first time since last July, the upward rush of wholesale prices screeched to a halt, registering 116.9 per cent of the 1947-1949 base period in March. It was 117.0 per cent in February. The index for all commodities other than farm and foods showed further weakness in early April, partially negating a strong upward trend in agricultural products. Still, it is likely that the total index will re-establish itself at 117 or better this month.

Building Patterns Mixed

Expenditures for construction in March set a record for the month at $3.172 billion, report the Commerce and Labor departments. This was 9 per cent above February and 3 per cent ahead of March, 1956. The first quarter annual rate reached $44.8 billion, $500 million better than actual 1956 spending.

But both housing starts and heavy construction awards continue in the doldrums. In March, the annual rate of starts fell to 880,000 units. Through the week ended Apr. 11, awards for heavy construction are 21 per cent under the comparable 1956 pace, says *Engineering News-Record*. Federal construction is charging along 54 per cent ahead of the 1956 pace, but private construction is off.

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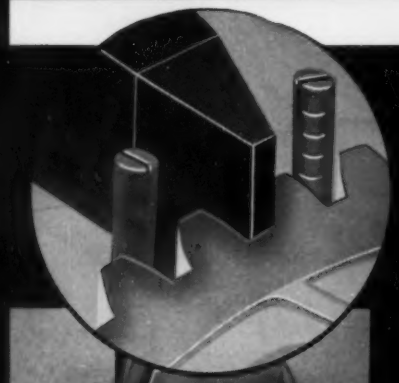

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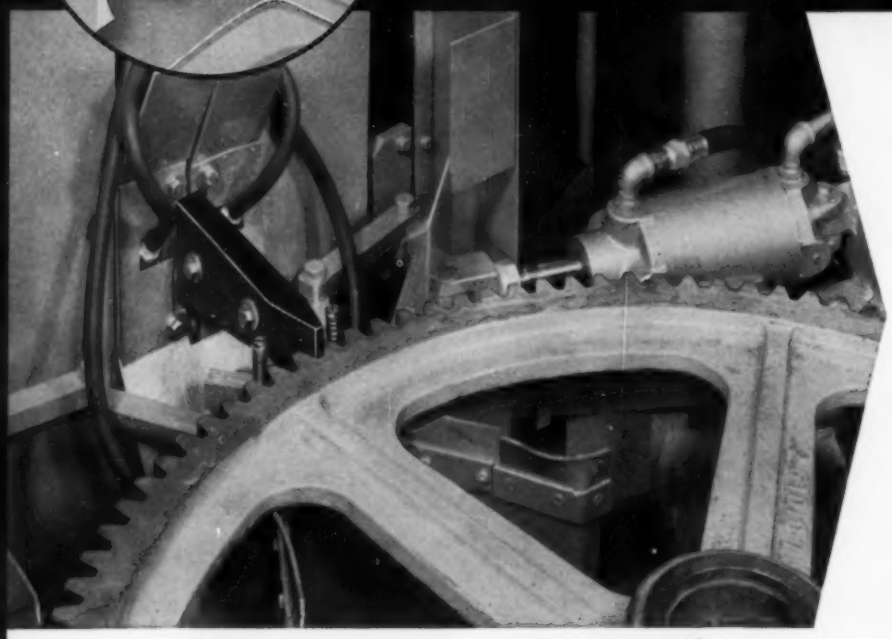

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KENNETH E. BLESSING
Wheelabrator div. sales

NORMAN E. WOONTON
Cowles manufacturing v. p.

JOHN S. APPLEYARD
Marlin-Rockwell plant mgr.

J. E. Swanson was elected president, **Graver Tank & Mfg. Co. Inc.**, East Chicago, Ind. He succeeds **E. N. Gosselin**, now chairman. Mr. Swanson was executive vice president.

Wheelabrator Corp., Mishawaka, Ind., appointed **Kenneth E. Blessing** sales manager of its dust and fume control division. Formerly district manager of the firm's New York office, he is replaced by **Lawrence W. Kohlmeyer. George F. Jones** was made district sales engineer in the Chicago office.

Leonard Sax was elected president of **American Buff Co.**, Chicago. He was secretary-treasurer.

Harcourt M. Sylvester, joint owner of **Fasco Industries**, Rochester, N. Y., acquired the interest of **Harry P. Toppin** in the company. Mr. Sylvester is now president, succeeding Mr. Toppin, who is now chairman. **Harcourt M. Sylvester Jr.** was elected vice president-secretary; **John W. Gasink**, vice president-treasurer; **Richard W. Gysel**, vice president-manufacturing; **D. Robert Schroedel**, vice president-sales.

Henry M. Jameson was made general manager of **Bucyrus-Erie Co.'s** drill division at Richmond, Ind., where a plant is under construction. **James I. Carmichael** was elected president of Bucyrus-Erie Co. of Canada Ltd.

Peter J. Prevas was named assistant plant superintendent of **Arcrods Corp.**, Sparrows Point, Md.

Norman E. Woonton fills the new post of vice president-manufacturing at **Cowles Chemical Co.**, Cleveland. He was manager of the Skaneateles Falls, N. Y., plant and continues headquarters there.

William M. Paradise was made purchasing agent for **International Business Machines Corp.'s** new manufacturing plant at Burlington, Vt.

Russell F. Sanders was named director of engineering and sales at the Rochester, N. Y., products division of **General Motors Corp.** He succeeds **Elmer Olson**, now on leave of absence.

Dr. Roland Van Der Beck was made manager of the product engineering branch of **Carborundum Co.'s** Stupakoff Division in Latrobe, Pa.

Hein-Werner Corp., Waukesha, Wis., elected **John D. Watson** president; **Edward G. Bach**, chairman. They succeed the late **G. G. Hein.**

J. S. Morgan was made director of domestic sales for **Allis-Chalmers Mfg. Co.'s** industries group, Milwaukee.

Emerson L. Claussen was elected vice president - sales, **Standard Screw Co.** He continues headquarters at Chicago Screw Co. Division, Bellwood, Ill., where he served as sales manager.

Bernard Campbell was named assistant vice president-operations at **Calstrip Steel Corp.**, Los Angeles.

John S. Appleyard was made plant manager of **Marlin - Rockwell Corp.'s** Plainville, Conn., division. He succeeds **Robert E. Gamble**, retired. Mr. Appleyard was factory manager.

Robert V. Merrell was made administrative assistant to the sales director of **Atkins Saw Division**, Borg-Warner Corp., Indianapolis. He was eastern division manager.

Albert M. Dexter was named assistant to the manager of the gage division at **Pratt & Whitney Co. Inc.**, West Hartford, Conn. **Arthur H. Wolfson** was made manager of gage research.

William Facer was made plant manager, **Titanium Fabricators Inc.**, Burbank, Calif. He was plant superintendent for Axelson Mfg. Co.

James McLaughlin was named vice president of **Triangle Steel & Supply Co.**, Los Angeles.

Edward V. Hegg was appointed manager of process equipment sales for **Goslin-Birmingham Mfg. Co.**, Birmingham.

Arsham D. Zaharian was made chief project engineer in turbine production for **Solar Aircraft Co.**, San Diego, Calif.

John Thomas was made factory manager at **Tait Mfg. Co.**, Dayton, O. He was chief industrial engineer.

Roderick Martin Jr. was made

R. W. COUCH

CARL R. GLOSKEY

Metal & Thermit appointments

P. E. SANCE

CARL A. BREUER

Pittsburgh Steel executive posts

Florida district manager for **H. M. Harper Co.**, Morton Grove, Ill.

R. W. Couch was made manager of electrochemical research and development, **Metal & Thermit Corp.**, Rahway, N. J. He is in charge of the Detroit and Michigan laboratories. **Carl R. Gloskey** was made manager of a recently formed process development division.

C. H. Kelly was made manager of **Broderick & Bascom Rope Co.'s** new branch and warehouse in Atlanta.

Eli Chappe was made vice president - commercial sales, **Kurz & Root Co.**, Appleton, Wis. He was vice president, International Diesel Electric Co. Inc.

Frederick E. Ullman was made general manager of engineering at **Inland Steel Container Co.**, Chicago, division of Inland Steel Co. He was director of engineering, Triangle Package Machinery Co.

American Chemical Paint Co., Ambler, Pa., elected **George H. Williamson** vice president in charge of west coast activities. His new responsibilities include supervision of sales and service of the firm's metalworking and agricultural chemicals and processes, and manufacturing activities at the Niles, Calif., plant.

Wilbur B. Driver Co., Newark, N. J., elected: **Sidney A. Wood**, executive vice president; **William J. Wind**, senior vice president; **Norman P. Norlie**, vice president-sales; **H. Clark Smith Jr.**, vice president-research and engineering. **Raymond O. Hallberg**, general superintendent, was named secretary; **Samuel Rankin**, treasurer.

Donald M. Whitney was made district sales manager in Oakland, Calif., for the **Cyclone Fence Department**, American Steel & Wire Division, U.S. Steel Corp.

Carl L. Bobzin was made senior tool design engineer, **Maytag Co.**, Newton, Iowa. **Robert C. Thompson** was made superintendent of finishing at Plant 2.

Robert J. Pierson fills the new post of plumbing sales manager, home products division, **Rheem Mfg. Co.**, Chicago.

Bell Aircraft Corp., Buffalo, named **Robert M. Hawley** to the new post of director of sales, weapons systems division.

Roy E. Ferree was named president, **Treesdale Laboratories & Textile Processing Co.**, Pittsburgh. **John R. Loutzenhiser** was elected chairman. **Alexander L. Suto** and **Joseph Schuchert Jr.**, attorneys, were named vice presidents. The newly elected officers will serve in similar capacities with the subsidiary, Pittsburgh Metals Purifying Co.

Charles H. Schwerin was made manager of west coast sales for Mackintosh-Hemphill and rolling mill divisions of **E. W. Bliss Co.** He is at the branch plant in San Jose, Calif. Mr. Schwerin was manager, industrial furnace division, Gas Machinery Co.

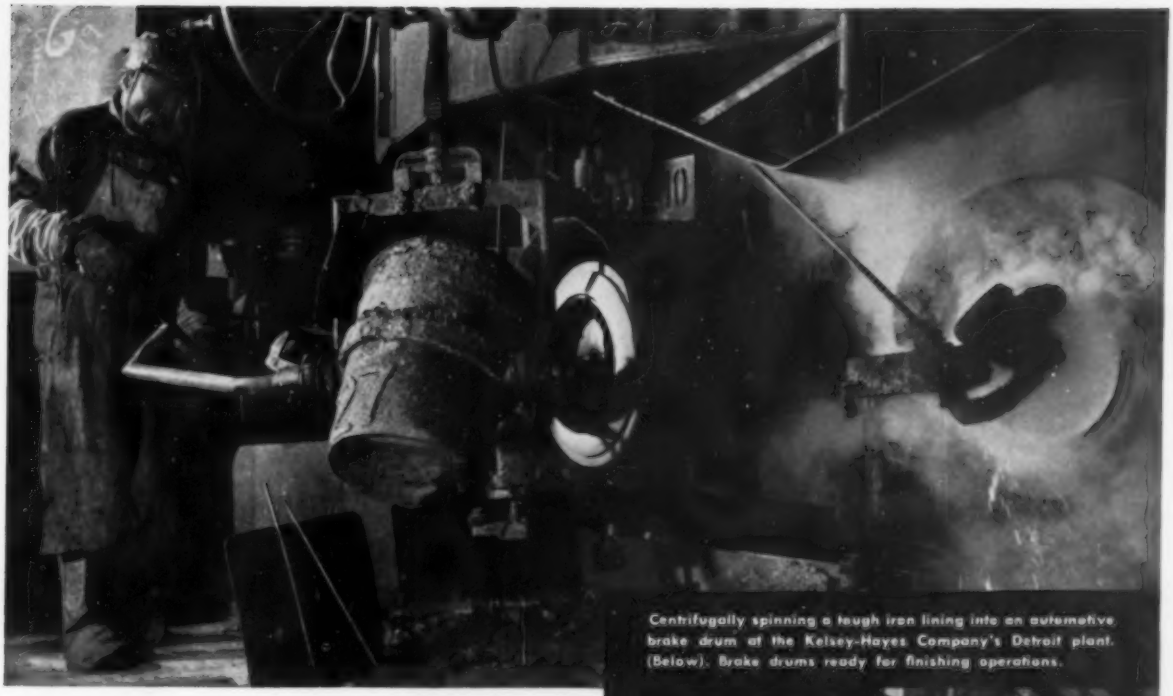
Jarvis Corp., Middletown, Conn., appointed **Ernest F. Dooley** carbide tool engineer.

P. E. Sance was elected executive vice president of **Johnson Steel & Wire Co.**, Worcester, Mass., subsidiary of **Pittsburgh Steel Co.**, Pittsburgh. Assuming this position May 1, he will continue to serve as a vice president of the parent company. Succeeding Mr. Sance as Pittsburgh Steel's vice president-operations will be **Carl A. Breuer**, now general manager of operations. **E. Milton Barber** retires, effective July 1, as vice chairman of Pittsburgh Steel and as executive vice president of Johnson Steel & Wire. He will be retained as a consultant. **Joseph R. Carter**, in charge of operations at Johnson Steel, becomes assistant to the vice president-operations at Pittsburgh Steel, effective June 1. **Donald C. Duvall** will become assistant to the president of Pittsburgh Steel, continuing as vice president-industrial relations.

Stanford Landell fills the new post of works manager of **Brown-Lipe-Chapin Division**, General Motors Corp., in charge of production at Syracuse, N. Y., and Elyria, O., plants. **Wayne A. Smith** succeeds Mr. Landell at Syracuse as director of sales and product engineering.

Forrest F. Tiffany joined **Olin Mathieson Chemical Corp.** as sales manager, Cincinnati-Dallas Division for Olin Aluminum. He has headquarters in Cincinnati. **Fred H. Edgar** fills the same position for the Detroit-Cleveland division, with headquarters in Detroit.

Arthur L. Shirley was made sales promotion manager of **Speco Inc.**, Cleveland. He was formerly with



Centrifugally spinning a tough iron lining into an automotive brake drum at the Kelsey-Hayes Company's Detroit plant. (Below). Brake drums ready for finishing operations.

Kelsey-Hayes casts longer wearing brake drums with Hanna pig iron

Kelsey-Hayes is a key supplier to the auto industry. One of its leading products is a brake drum with a centrifugally spun iron lining. Kelsey-Hayes also produces thousands of sand cast brake drums. Strict uniformity of each melt is of major importance to Kelsey-Hayes.

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RUDOLPH TIETIG JR.
joins Kaiser Engineers

Gibson Homans Co. and Minneapolis-Honeywell Regulator Co.

Glenn A. Stertzbach was made master mechanic at **George L. Day Co.**, Buffalo, in charge of manufacturing and service of special presses, machines and component units built by the firm.

Dale R. Versaw was appointed purchasing agent for **Kennametal Inc.**, Latrobe, Pa. For the last six years he was with Westinghouse Electric Corp., most recently serving as purchasing agent for the commercial atomic power division.

Richard N. Vandekieft was elected vice president-engineering, **Safway Steel Products Inc.**, Milwaukee. He was chief engineer.

S. J. Burk was elected president, **Ditto of Canada Ltd.**, subsidiary of Ditto Inc., Chicago. He was also named president of **Ditto (Quebec) Ltd.** **S. P. Robinson** was elected vice president of both Canadian companies.

Rudolph Tietig Jr. joined **Kaiser Engineers**, division of Henry J. Kaiser Co., Oakland, Calif., as a principal engineer, steel plants division. He has been with a firm of Chicago engineering consultants for the last ten years.

N. M. Reiners was named vice president-research, **Cummins Engine Co. Inc.**, Columbus, Ind.

George Milburn was made sales supervisor of **Patterson Foundry & Machine Co. (Canada) Ltd.** He was district manager at Montreal and continues headquarters there.

Robert W. Ramage was made assistant manager, eastern sales, **Bliss & Laughlin Inc.** He has headquarters in Buffalo.

N. L. Mahla was made Cleveland district sales manager, **Clearing Machine Corp.**, division of U.S. Industries Inc.

Lloyd G. Stewart was made district sales manager, **Research-Cottrell (Canada) Ltd.**, Toronto, Ont.

Avrel Mason, formerly chief engineer of **Cargill Detroit Corp.**, Birmingham, Mich., was made general manager of a new division formed to handle engineering, manufacturing and sales on all automatic gaging and size controls. He is succeeded by **Belding H. McCurdy.**

Kenneth E. Joy, formerly vice president-sales, Bostitch Inc., was elected to the new post of executive vice president-marketing at **Auto-Soler Co.**, Atlanta.

Arthur L. LaMasters, formerly vice president of Alloy Engineering & Casting Co., joined **Michigan Industries Co.**, division of Consolidated Foundries & Mfg. Corp., Detroit, as vice president-sales.

OBITUARIES...

George A. Fyrberg, production manager, abrasive division, **Norton Co.**, Worcester, Mass., died Apr. 6.

Chester M. Lawson, 56, founder, president and treasurer of **Lawson Machine & Tool Co.**, Malden, Mass., died Apr. 6.

John A. Zurn, 82, founder of **Zurn Industries Inc.**, Erie, Pa., died Apr. 4.

Giles J. Mundy, 60, vice president, **Haughton Elevator Co.**, Toledo, O., died Apr. 2.

G. L. Blanton, 69, retired Wisconsin district sales manager, **Chain Belt Co.**, Milwaukee, died Apr. 5.

George Page, 63, vice president, **Vierling Steel Works**, Chicago, died Apr. 5.

Louis F. Kash, 49, president, **Aircraft Screw Machine Products Co.**, Chicago, died Apr. 6.

Mrs. Celia E. Bennett, general manager and treasurer, **Bay State Stamping Co.**, Worcester, Mass., died Apr. 10.

William M. Durkin, 62, retired vice president, **Whitmore Mfg. Co.**, Cleveland, died Apr. 9.

Harry Way, 50, secretary-treasurer, **Offenhauser Co.**, Houston, died Apr. 5.

CLEAN AS A WHISTLE—with HOUGHTON Cold Cleaners

The first job of a cleaner is to CLEAN. And that's where the new Houghton Cold Cleaners won the approval of production men. Working at room temperature in either still tank or power washers, Houghton Cold Cleaners do a better, quicker, more thorough job at less cost. And they also offer many other advantages.

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Coils Move Faster

Granite City Steel's new $1.3-million coil conveyor and storage area promise big savings

GRANITE CITY STEEL CO., Granite City, Ill., has completed another project in its current $33-million expansion program: A pallet chain conveyor and coil storage area that link the end of its continuous hot rolling mills with the start of its pickle line, where the steel is cleaned and oiled prior to cold rolling.

The $1.3-million conveyor and storage area should result in substantial efficiencies and savings, says G. B. Schierberg, president and treasurer. They tie in with an increase in the firm's cold rolling capacity which will come when it improves its pickle line and tandem cold strip mill this year.

20-Ton Coils—The 705-ft, 400-hp pallet chain conveyor can transfer 148,000 lb of steel a minute. A single coil may weigh as much as 40,000 lb and contain up to 1500 ft of steel.

Coils sit on end on top of two parallel rows of four-wheeled pallets which run on tracks. The pallets form endless chains for each of the conveyor's six sections. An automatic hoist at the end lifts each coil about 12 ft and positions it at the entry of the pickle line.

Mr. Schierberg points out that coil handling has been reduced. Previously, they were moved in railroad gondola cars. The conveyor and storage area will make possible more efficient scheduling of coils of the same width and gage through the pickle line and tandem cold strip mill.

Reynolds Expands at Listerhill

Reynolds Metals Co., Louisville, will expand its aluminum manufacturing facilities at Listerhill, Ala., at a cost of about $60 million. This is in addition to the expansion project already under way which is tied in with the construction by Ford Motor Co. of an aluminum foundry adjacent to the Reynolds plant.

The new program will bring the total new investment of the two companies at Listerhill to around $200 million. All projects are expected to be completed in 1958.

Alcoa's program calls for new sheet and plate facilities to add about 150,000 tons to their annual capacity; modernization of the breakdown mill to provide widths up to 170 in.; and modernization of the continuous hot line to increase widths to 120 in.

Orders Blast Furnace Blower

Westinghouse Electric Corp., Pittsburgh, will build a gas turbine blowing system capable of supplying 125,000 cu ft of air a minute to blast furnaces at United States Steel Corp.'s South Works, Chicago. The system will be the first application of a gas turbine for furnace blowing in the American steel industry, Westinghouse officials say.

Hagan Chemicals To Expand

Hagan Chemicals & Controls Inc., Pittsburgh, will build a research center and headquarters offices on the Penn-Lincoln Parkway West, Pittsburgh. Estimated cost: $1,750,000.

National Can To Lease Plant

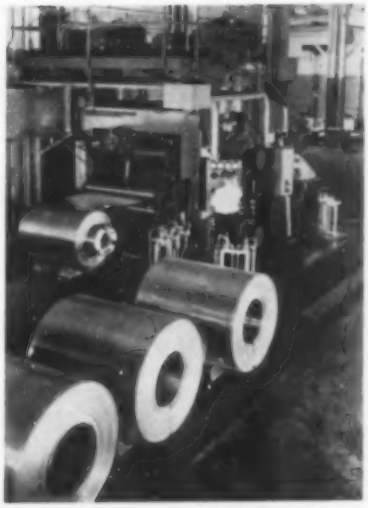
National Can Corp., New York, will lease a can manufacturing plant being constructed by Quaker Oats Co. at Marion, O. Construction is scheduled for completion by the end of this year.

Will Build Pelletizing Plants

Exclusive rights to license the process and equipment for pelletizing iron ore by the Erie Mining Co. shaft furnace method have been acquired by Surface Combustion Corp., Toledo, O. The company is prepared to design and build complete pelletizing plants.

Awards Coke Oven Contract

Dominion Foundries & Steel Ltd., Hamilton, Ont., awarded Koppers Co. Inc., Pittsburgh, a contract to design and erect a battery of 45 Koppers-Becker coke ovens at its works. The ovens will increase the firm's coke making capacity by 75 per cent and will have a capacity to carbonize 1045 tons of coal a day. Koppers also will install equipment extending the coke handling and coal preparation systems.



More Sheet Aluminum

Sheet Aluminum Corp., Jackson, Mich., increased its sheet and strip production capacity from 10 million to 25 million lb by the addition of new facilities. They include a 4-high cold rolling mill (above), which is as large as many of its type in the steel industry, and a combination slitting-shearing line. Both were designed by E. W. Bliss Co., Canton, O. A continuous annealing furnace also has been installed

Pittsburgh Steel Orders Mill

Pittsburgh Steel Co., Pittsburgh, awarded a contract to F. H. McGraw & Co., New York, to install a 6-stand (30-in.) billet mill and auxiliary equipment at its Monessen, Pa., plant. The facility is expected to be put into operation some time next year.

Plans Testing Facilities

Rome Cable Co. will build a $500,000 research center at the company's main plant in Rome, N. Y. Included in the 25,600 sq-ft facility will be a complete pilot plant and an outdoor area for "weather testing" cables.

Harsch Sells Cleveland Plant

Harsch Bronze & Aluminum Foundry, Cleveland, sold its business and plant to Crucible Mfg.

Corp., a subsidiary of Consolidated Foundries & Mfg. Corp., Chicago. Crucible's president, G. W. Myers, is general manager of Harsch.

CONSOLIDATIONS

Merger of **Birtman Electric Co.** into **Whirlpool-Seeger Corp,** Chicago, became effective Apr. 1. Name of the merged corporation is Whirpool Corp.

United Plating Corp., Chicago, was formed through the purchase by **United Products Co.** of **National Plating Co.** and **Superior Plating Works.** Officers of the new company are: President, R. K. Sweeney; executive vice president, G. A. Loveless; and vice president, Ray Michalek.

Pendleton Tool Industries Inc. purchased **Pico Precision Products Inc.** of Pico, Calif., manufacturer of tooling and testing equipment. Pendleton will operate the property as a subsidiary.

Control of **Riteway Mfg. Co.,** Harrisonburg, Va., has been assumed by **Virginia Metalcrafters Inc.,** Waynesboro, Va., maker of iron castings.

Mendon Research & Development Co. Inc., Rochester, N. Y., builder of machinery and precision machinists of metal parts, purchased the **Ashley Machine Works,** that city. Ashley will be operated as a subsidiary and will expand its machining operations.

ACF Industries Inc., New York, has combined its **Nuclear Energy Products** and **ERCO divisions** and will carry on its operations as the Nuclear Products-ERCO Division. Dr. M. G. Holloway is president of the enlarged division which will maintain headquarters at the ERCO plant in Riverdale, Md.

Dresser Industries Inc. acquired **Hermetic Seal Transformer Co. Inc.,** Garland, Tex. A manufacturer of transformers and reactors, Hermetic Seal will become a division of Southwestern Industrial Electronics, another of the Dresser Industries.

NEW ADDRESSES

Chas. A. Strelinger Co. moved to 31855 Van Dyke Ave., Warren (Detroit), Mich. The company is a distributor of machine tools, metalworking machinery, power tools, cutting tools, material handling equipment and industrial supplies.

California operations of **Aero Hydraulics Division, Vickers Inc.,** Detroit, have been moved to a new plant at 3201 Lomita Blvd., Torrance, Calif. The division makes aircraft, missile and engine hydraulic systems and components. B. L. Stone is California operations manager.

Assembly Engineers Inc. opened its new 10,000 sq-ft plant at 5970 W. Jefferson Blvd., Los Angeles, Calif. The firm makes precision machined parts for the electronic and aircraft field.

Binks Mfg. Co., Chicago, moved its Dallas branch to 8005 Sovereign Row. The company makes spray painting equipment for industrial finishing.

W. L. Maxson Corp., New York, opened a district office at 6 Perry Blvd., Ft. Walton Beach, Fla. The company specializes in research, development and production of airborne, ordnance and missile systems and equipment for the armed services.

Clearing Machine Corp., a division of U.S. Industries Inc., Chicago, opened a branch office at 1513 Jefferson St., Toledo 2, O. The firm makes heavy metalworking presses.

Philips Electronics Inc., Instruments Division, opened a new Norelco office at 1825 Grant Ave., Philadelphia.

H. B. Fuller Co., maker of industrial adhesives, moved to a new manufacturing plant at 1144 Eustis St., St. Paul, Minn.

St. Augustine, Fla., operations of the former Speed Control Division of the **Fairchild Engine & Airplane Corp.** have been integrated with the Industrial Products Branch of Fairchild's Stratos Division at West Babylon, Long Island, N. Y.

General Electric Co. moved its X-ray Department to 3829 Carnegie Ave., Cleveland 15, O.

ASSOCIATIONS

American Welding Society, New York, will install these newly elected officers June 1: President, C. P. Sander, general superintendent, Vernon, Calif., plant, Consolidated Western Steel Division, U.S. Steel Corp.; first vice president, G. O. Hoglund, Aluminum Co. of America, New Kensington, Pa.; second vice president, C. I. MacGuffie, Welding Department, General Electric Co., York, Pa.; treasurer, H. E. Rockefeller, Linde Air Products Co., New York.

C. R. Dodson was elected treasurer of the **American Institute of Mining, Metallurgical & Petroleum Engineers Inc.,** New York.

National Screw Machine Products Association, Cleveland, elected these officers: President, D. B. Jefferson Jr., Walker Mfg. Co., Medfield, Mass.; vice president, C. J. Baumgart, Screw Machine Engineering Inc., Chicago; treasurer, L. R. Schaffer, Mechanical Art Works Inc., Newark, N. J. Orrin B. Werntz was re-elected counsel and executive vice president; Margaret S. Ballinger, secretary.

Officers elected by the **National Association of Corrosion Engineers,** Houston, are: President, W. H. Stewart, Sun Pipe Line Co., Beaumont, Tex.; vice president, L. L. Whiteneck, Plicoflex Inc., Los Angeles; treasurer, A. L. Stegner, Tennessee Gas Transmission Co., Houston.

William E. Arnold has been appointed field secretary of the **National Tool & Die Manufacturers Association,** Cleveland.

Metal Curtain Wall Division of the **National Association of Architectural Metal Manufacturers** will be formally organized at the association's annual convention in San Francisco May 7-12.

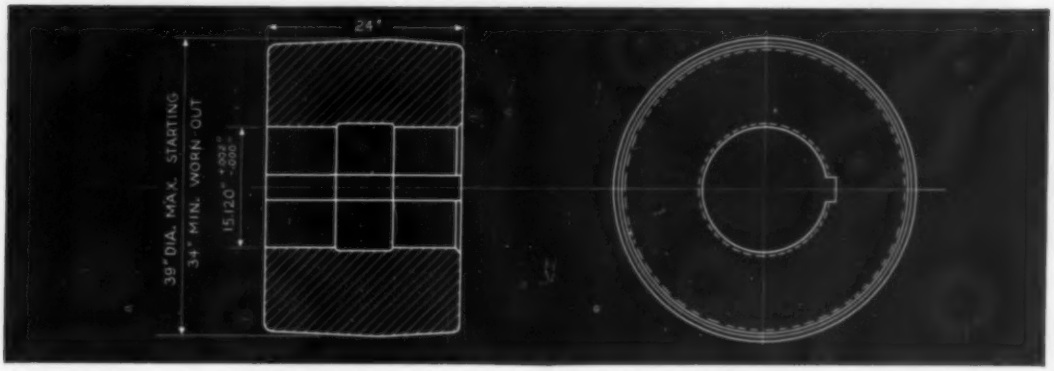
TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

THE SECRET OF GOOD TUBE MILL RINGS:

Put the extra metal where it does the least harm



Any roll ring cast with a cored hole creates special problems. Tube mill piercing rolls are no exception.

General foundry practice has been to allow sufficient stock on both the outside diameter and bore to permit "giving a little and taking a little" to "true" the finished O.D. with the I.D. when machining. Mack-Hemp foundrymen have modified this practice by keeping the outside stock at a minimum and increasing the stock in the bore. This extra stock in the bore provides an ample margin for "truing up" the two diameters during finishing, with only a bare minimum of metal removed from the O.D.

The roll user benefits in two ways—better rings at a lower price. In the first place, with roll rings priced as they are, on a "cent-per-pound-on-rough-weight" basis, he saves money. This is because extra metal near the center of the roll weighs far less than the same thickness at the roll surface. For instance, every ¼" of oversize on the O.D. of a 39" diameter, 24" long ring adds roughly 110 pounds of metal. On the other hand, ¼" extra stock on the 15" bore of the same ring adds only 40 pounds.

The segregation problem—Even more important, however, is the improvement in the depth of sound metal below the surface of the cast roll which is gained by casting to minimum tolerances on the O.D. and maximum on the I.D. Mack-Hemp tube mill rolls are noted for their freedom from the "segregated streaks" which lead to scrapping before worn-out diameter. Since these flaws usually occur at a fairly regular depth below the outside surface of a cast roll, the closer the O.D. as-cast diameter is to the finished diameter, the deeper this zone of segregation.

The relation of "bite" to hardness and wear—A very important requisite of a piercing mill roll is good "bite" to eliminate slippage. Ideally, this should be achieved without sacrificing too much wear resistance. Fortunately, bite and wear resistance are not always in direct proportion to hardness. Both these qualities can be combined—at least to a degree—in the same roll. For example, a roll of one alloy type may slip more than a harder roll of another type. Today, higher speed mills have stepped up the demand for these better, harder rolls.

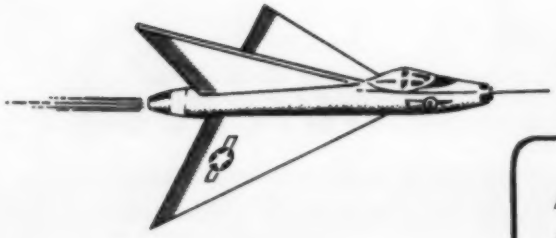
Mack-Hemp's broad experience with the many tube mills now in operation can be of real help to any tube mill operator with a roll problem. And it's the same story no matter what your type of mill. For help with any problem of roll use, call on Mackintosh-Hemphill Division, E. W. Bliss Company, 901 Bingham Street, Pittsburgh 3, Pennsylvania.

MACKINTOSH-HEMPHILL

You get more tonnage from the rolls with the Striped Red Wabblers

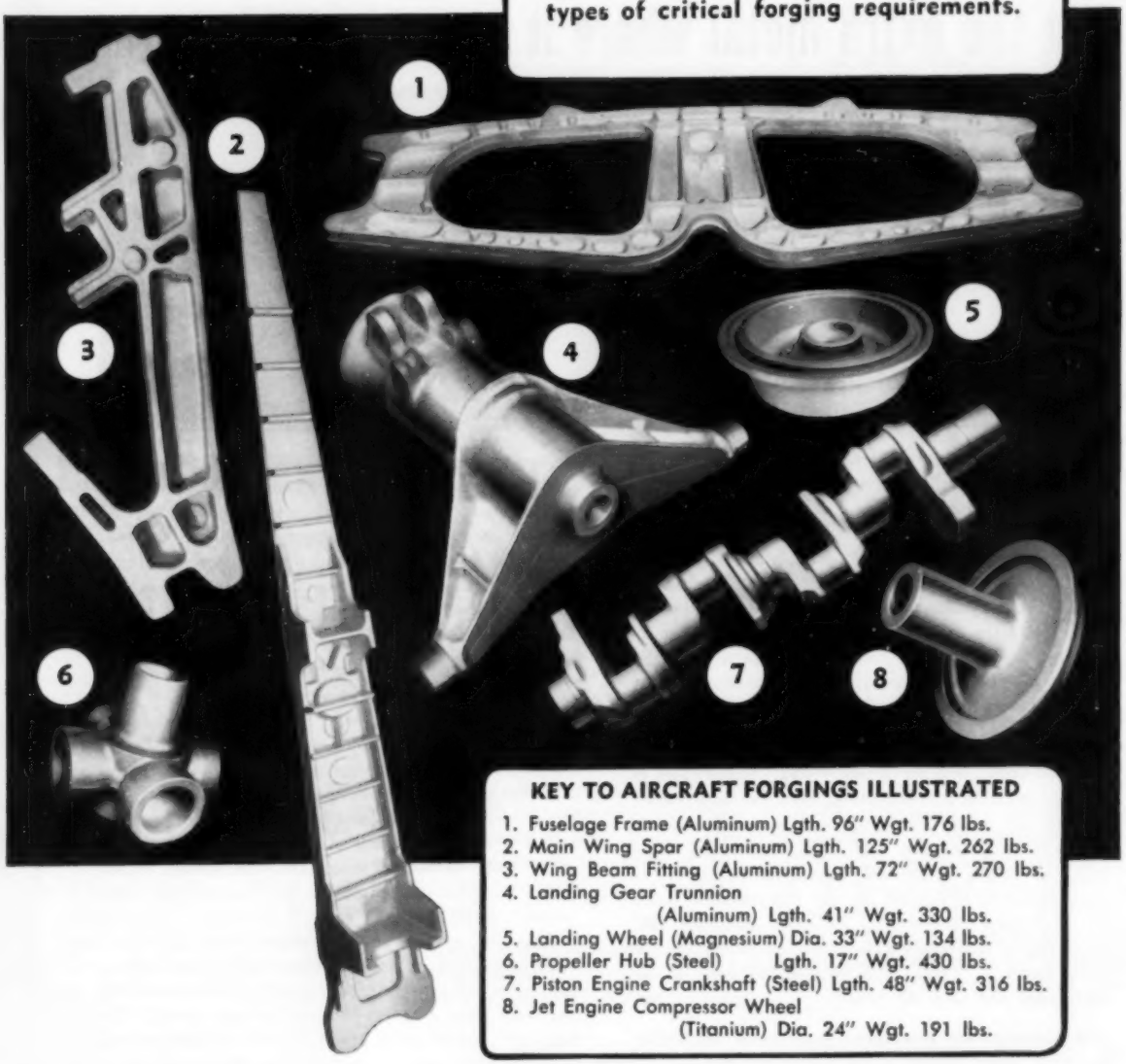
Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery



DEPENDABILITY...

Aviation engineers and designers since the beginning of the Aircraft Industry have relied on Wyman-Gordon for all types of critical forging requirements.



KEY TO AIRCRAFT FORGINGS ILLUSTRATED

1. Fuselage Frame (Aluminum) Lgth. 96" Wgt. 176 lbs.
2. Main Wing Spar (Aluminum) Lgth. 125" Wgt. 262 lbs.
3. Wing Beam Fitting (Aluminum) Lgth. 72" Wgt. 270 lbs.
4. Landing Gear Trunnion (Aluminum) Lgth. 41" Wgt. 330 lbs.
5. Landing Wheel (Magnesium) Dia. 33" Wgt. 134 lbs.
6. Propeller Hub (Steel) Lgth. 17" Wgt. 430 lbs.
7. Piston Engine Crankshaft (Steel) Lgth. 48" Wgt. 316 lbs.
8. Jet Engine Compressor Wheel (Titanium) Dia. 24" Wgt. 191 lbs.

WYMAN-GORDON COMPANY

Established 1883

FORGINGS OF ALUMINUM • MAGNESIUM • STEEL • TITANIUM

WORCESTER 1, MASSACHUSETTS

HARVEY, ILLINOIS • DETROIT, MICHIGAN

STEEL

April 22, 1957

Technical Outlook

TITANIUM PROGRESS— Titanium sheet alloys with strengths 30 to 50 per cent higher than previous ones are being turned out in plants of three producers under the Department of Defense's sheet rolling program. Its purpose: Make heat treatable alloys commercially available as soon as possible.

TURBINE POWER— Solar Aircraft Co., San Diego, has sold over a thousand 50 and 500-hp gas turbines. Alexander Black, vice president, says they went to more than 35 customers and are being used in over 50 separate applications either as auxiliary power units or in direct propulsion.

REDUCING TREATMENT— A new cold rolling mill makes standard 1¼-in. nonferrous tubes from pierced or extruded 3-in. shells. Made by the Aetna-Standard Engineering Co., Pittsburgh, the mill handles up to five tubes at once, reducing them 90 per cent in one operation. It's the equivalent of five draw passes or the production of two triple-draw benches. Rolling eliminates pointing, sawing and crane handling and produces tubes to exceptionally close tolerances.

HARDSURFACING TESTING— In the opinion of D. B. Rankin, Rankin Mfg. Co., Alhambra, Calif., the only reliable way to evaluate a hardsurfacing rod is to test it in the field. At the recent Western Metal Congress, Los Angeles, he suggested these rules for best results: 1. In comparing competitive rods, be sure you're following the maker's recommendations. 2. Use the correct application techniques and welder settings: They can make or break the best hard surfacing materials. 3. Apply the rod at the right heat: Too much can cut wear resistance in half. 4. Make sure you apply the same amount of wear to all samples.

REACTOR REPAIRS— Westinghouse Electric Corp., Pittsburgh, is working with a major equipment maker to develop a welder for atomic reactors that can be operated by remote control. When completed, the machine will remove a section of reactor piping, replace it with a new piece and inspect welds as they are made. The operator will watch through a closed-circuit television setup and make adjustments from a safe vantage point.

WELDING PROGRESS— Add Dualshield to your list of semiautomatic processes which help welders do a better job. It uses CO_2 and a hollow wire filled with flux to protect weld metal. The makers, National Cylinder Gas Co., Chicago, took the wraps off the new system at the recent welding show in Philadelphia.

ATOMIC SHIP— A pressurized water reactor will power the first atomic merchant ship. Capable of 20,000 shaft horsepower, it will have stainless steel clad, uranium fuel elements enriched in U-235 to 2.9 per cent. The reactor will power both the ship's propulsion machinery and auxiliaries, such as electrical generation plants, the heating system and cargo handling equipment. Babcock & Wilcox Co., New York, has a $9,872,000 contract from the AEC to develop and fabricate the reactor and other components of the propulsion system.

Metalworking Outlook—p. 39 *Market Outlook—p. 121*

What Makes a Good Deep Drawing Steel?

Until better deep drawing tests are devised, users will turn to specifications such as those described in this article to get the materials they need

DEEP DRAWING steels leave much to be desired in the opinion of producers and users who recently attended a conference on the subject in Detroit. "How do you determine a good deep drawing steel?" they wanted to know, adding: "We need a better test of drawability."

"Picking a good deep drawing steel is still an art," admitted Frank M. Tousley, staff engineer, Auto Body Division, Chrysler Corp. His company has developed procedures to help the art along.

Chrysler plants routinely sort drawing sheets into these categories for any given job: 1. Material obviously capable of producing the part. 2. Material obviously unsuitable. 3. Material not clearly in either category. The third receives further inspection to determine its properties, said Mr. Tousley. The initial sorting is carried on in steel stores areas.

All Shades — General Motors Corp. has gone deeply into specifications for deep drawing steels. Homer C. Pratt, chief metallurgist, Fisher Body Materials Laboratory, described the GM system for selecting and processing sheet steel for auto body panels.

Fisher Body recognizes eight grades of low carbon, unalloyed sheet steel. The grade necessary to make any given part is specified on the part print and specification. GM has corresponding grades, plus an ungraded quality (see table).

Three Questions—Three factors are of first importance in selecting the right grade for the job:

1. Is the part hidden or exposed in the auto body?
2. Does fabrication require a moderate, severe or extremely severe draw?
3. What are the physical properties of each grade. (What can we reasonably expect the

Cold-Rolled Sheet Steel for Drawing—General Motors Standards

Description	Rockwell Hardness max	Yield Point max psi	Tensile Strength min psi	Gage	Per Cent Elongation min in 2 in. Long. + trans.	Per Cent Elongation min in 2 in. Long. only	Cup Ductility min depth in in.; ⅝-in. diam test ball	Cleanliness ASTM Inclusions Rating
GM-A, Fisher Body 16-5E: Killed, nonaging, drawing quality. Must not stretcher strain when drawn.	B45	27,000	41,000	22 (0.30 in.) 20 (0.36 in.) 19 (0.42 in.) & up	37 39 40	31 31 31	0.384 0.400 0.416	A3T B2T D2T
GM-B, Fisher Body 16-2E: Rimmed, drawing quality. Cold reduced on continuous mill, box annealed and lightly skin rolled. Must not exhibit stretcher strains when level rolled immediately before fabrication.	B45	30,000 long. 32,000 trans.	41,000	22 20 19 & up	36 38 39	29 29 29	0.374 0.390 0.406	A3T B2T D3T
GM-C, Fisher Body 16-2U: Rimmed, drawing quality. Cold reduced on continuous mill. Box annealed last.	B46	30,000 long. 32,000 trans.	41,000	22 20 19 & up	36 38 39	29 29 29	0.374 0.390 0.406	A3T B2T D3T
GM-D, Fisher Body 16-1E: Rimmed, commercial quality. Cold reduced on continuous mill, box annealed and lightly skin rolled. Must not exhibit stretcher strains when level rolled immediately before fabrication.	B55	33,000 long. 35,000 trans.	41,000	22 20 19 & up	32 34 35	26 26 26	0.359 0.375 0.391	A3T B2T D3T
GM-E, Fisher Body 16-1U: Rimmed, commercial quality. Cold reduced on continuous mill, box annealed last.	B55	35,000 long. 37,000 trans.	41,000	22 20 19 & up	32 34 35	26 26 26	0.359 0.370 0.391	A3T B2T D3T
GM-F: Ungraded quality.	A tensile specimen shall withstand being bent flat on itself in any direction at room temperature.							

suppliers of sheet steel to furnish for each grade?)

Annealed last (steels with a minimum of cold work, such as flattening, following annealing) or hot-rolled steels can be used for nonexposed parts such as floor pans which do not require a decorative finish. GM designates such material with the symbol "U." "E" denotes cold reduced, box annealed and tempered steel that can be used for parts requiring decorative finishes. Both are recognized by the Society of Automotive Engineers in preference to designations such as "Roof Sheets" or "Rear Quarter Outer Panel Grade."

Draw Severity—Fisher Body engineers have developed a "unit area" test as an improved method for determining degree of draw. A 1-in. square grid is scribed on the blank. After a sample draw has been made, they measure the square showing the greatest stretch and determine the percentage of increase in its unit area. They can also measure the thickness of the metal in the square and calculate the increase in area from the amount of reduction.

The company has established these rules for parts drawn from 0.035 to 0.041 gage sheet steel:

Location	Area Increase	Quality
Concealed	25% or less	Commercial
Concealed	More than 25%	Drawing
Exposed	20% or less	Commercial
Exposed	More than 20%	Drawing

Suppliers—Contracts negotiated for steel to produce a given part (within specified breakage and surface defect allowances) leave the user in the dark as to the material's physical properties. These tests must be made to properly classify it: Ductility, hardness, and sometimes yield point, tensile strength and grain size.

When a problem arises, test results are important in determining if the material or the tooling is at fault. It is one way to minimize down time for adjustment of die pressures, made necessary by nonuniformity of sheet steel from one lift to another and one vendor to another.

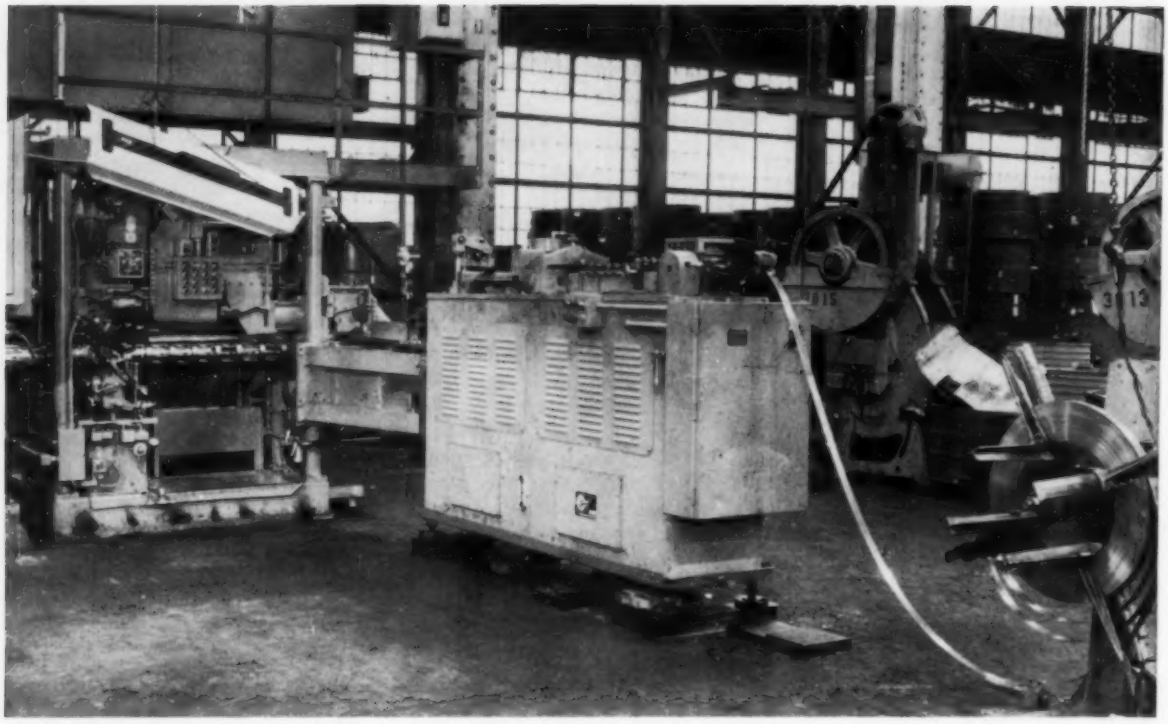
Surface—GM also classifies materials according to arithmetic average surface roughness as measured by a Surfaguage or Brush Analyzer (see table below). The quality of surface required is determined both by the final finish desired and the severity of the draw. Some operating personnel feel that a bright, smooth surface will not hold lubricants properly and will create difficulties in drawing. This must be reconciled with a surface that will produce the final finish with least preparation.

GM has also prepared specifications showing where steel with certain types of surface defects, such as skin laminations, slivers and orange peel, can be used. The specifications represent ideals which vendors cannot always meet. There are plenty of times when the company has to settle for second best.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

General Motors Sheet Steel Surface Classifications

Class	Finish	Average Roughness	Surface Evaluation	Grain Size ASTM Standards	Use
1	Extra fine	Under 10 microinches	Suitable for plating or quality finishing without special surface preparation.	No. 7 uniform elongated grains. Should contain no equiaxed grains.	Exposed parts. Extreme draws.
2	Fine	10—20 microinches	Suitable for plating if polished, and for other quality finishing without special surface preparation.	No. 7 rim and No. 7-8 core. Uniform equiaxed grains.	Exposed parts. Severe draws.
3	Medium	20—30 microinches	Not suitable for plating. Suitable for quality finishing with minimum surface preparation.	No. 7 rim and No. 7-8 core. Uniform equiaxed grains.	Concealed parts. Severe draws.
4	Medium coarse	30—40 microinches	Not suitable for plating. Suitable for quality finishing with surface preparation.	No. 6-8 uniform equiaxed grains. Some coalescent carbides and inclusions to be expected.	Exposed parts. Moderate draws.
6	Coarse	40—60 microinches	Not suitable for plating. Suitable for quality finishing with considerable surface preparation.	No. 6-8 uniform equiaxed grains. Some coalescent carbides and inclusions to be expected.	Concealed parts. Moderate draws.
9	Extra coarse	Over 60 microinches	Not suitable for plating. Not practical for quality finishing.		



1. In first step, coil stock is leveled and cut on the machine at center

Stator Rings Formed Automatically

Seven operations are linked together at Buick to produce transmission parts. All controls are interlocked. Panels are above the machine to save floor space

ONE STATOR ring comes off this machine every 6 seconds. In the transition from coil stock to formed, welded and crimped rings for Dynaflow transmissions, the operator is a watchdog. The cycle is completely automatic.

Built by National Electric Welding Machines Co., Bay City, Mich., it's at Buick Division, General Motors Corp., Flint, Mich.

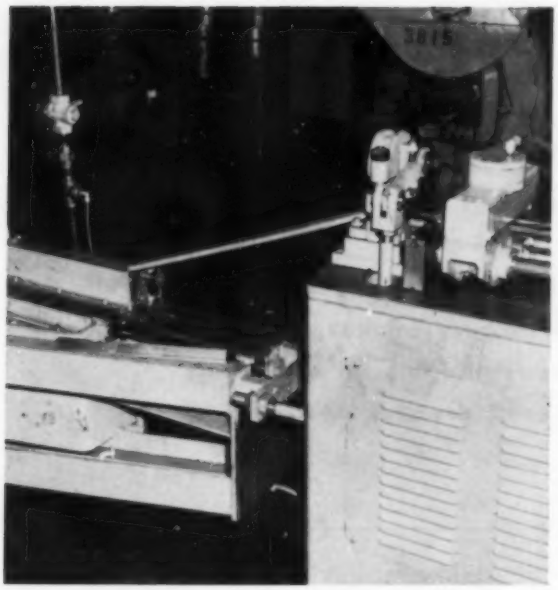
Blanks—Coil stock is cold-rolled SAE 1008, 1.493 in. wide and 0.060 in. thick. Gage is controlled to ±0.001 in. The stock feeds to a Sesco unit that levels and cuts it off to 20-in. lengths. (It was built by Special Engineering Service Inc., Detroit.)

Blanks drop down a chute into a hopper. They are fed into the machine from the bottom of the pile.

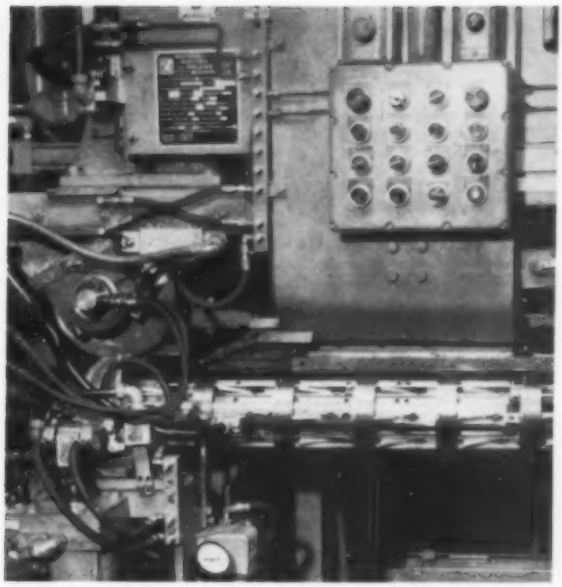
First, they feed through bending rolls that form them into 6.4-in. rings. Feed fingers push the rings off the rolls and onto an arbor that will carry them through the machine.

Weld—The arbor is segmented. Each segment carries spring-loaded fingers.

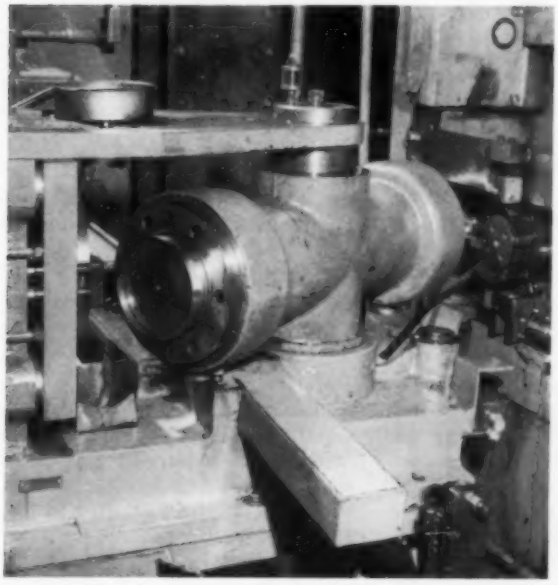
The segments reciprocate to carry rings to the weld station. The



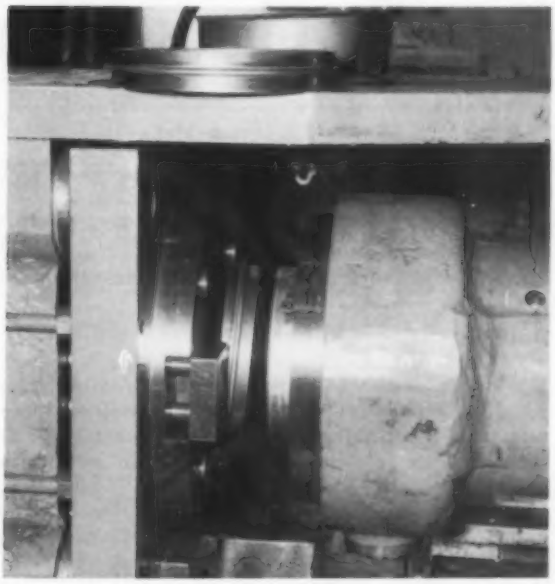
2. Cutoff lengths slide down into the hopper at left



3. Rings march across the arbor into the weld station at left



4. An index fixture picks off rings and indexes them 180 degrees for crimping



5. At final station, the ring is squeezed to form the circumferential crimp

open ring joint rides a knife edge at the top which keeps it upright.

As in pipe welding, a sandwich wheel (two segments separated by an insulator) rolls across the joint to make the resistance weld. The ring is then coined and the weld trimmed in a press station.

Transfer — At the end of the arbor, a transfer picks up the ring on a plug and indexes 180 degrees to the crimp station. The ring is sandwiched between two horizontal dies which squeeze up the rib in the center of the periphery.

Finally, the ring is ejected from the crimping dies and it drops through a chute onto a conveyor.

The conveyor carries the ring to an automatic loading and extracting device. This device locates the ring in the bottom of a press die.

As the dies on this press close, they pierce 20 holes into the periphery of the ring.

After the rings have been pierced, the extractor removes them from the dies and drops them into a chute that carries them into a container.

Factors Determining Heat Tolerance of Coatings

1. **Oxidation (and/or corrosion resistance).**
2. **Thermal stability.**
3. **Coefficient of thermal expansion relative to that of basis metal.**
4. **Tendency of coating to diffuse with the basis metal at the interface.**
5. **Properties of the diffusion alloy zone relative to performance needs.**
6. **Melting point of the coating and the diffusion alloy zone.**

How To Choose Heat Tolerant Coatings

In high temperature use, the nature of the interface between a metal coating and its base is particularly important. It can make or break the composite item

SURFACE deterioration can prevent the successful use of metals that have high temperature strength. One solution is a metallic coating that protects the surface, says Dr. Charles L. Faust, chief of the Electrochemical Engineering Division at Battelle Memorial Institute, Columbus, O.

Speaking before a symposium sponsored by the Albuquerque, N. Mex., chapter of American Society for Metals, Dr. Faust listed the metals shown in the table on the opposite page. He said they are getting the most attention for coatings on the basis of properties at high temperatures, methods of application and properties of their alloys.

How To Choose — The service temperature, time at temperature and size and complexity of the part will indicate which metal is a coating prospect and which process should be used to apply it, Dr. Faust explained. The factors in the above list will determine whether the coating will provide the necessary heat tolerance.

Oxidation—The chief reason for using a protective coating is to provide resistance to reactions with oxygen, nitrogen and other atmospheric gases, Dr. Faust told the symposium. Describing the protection various materials offer, he continued:

Chromium oxidizes superficially at about 2720°F. The alloy surface resulting from chromizing iron by vapor plating or high temperature diffusion resists oxidation to 1640°F. Aluminum in the coating raises the temperature limit to 1820-1910°F. Chromium absorbs hydrogen and nitrogen which harden it. Ductility is decreased.

Molybdenum—This metal rapidly oxidizes in air at 1110°F, and a volatile oxide forms. Carbon is absorbed to form carbide that hardens and embrittles molybdenum, but the metal isn't affected by hydrogen and nitrogen.

Platinum is not attacked in air up to its melting point. Iridium forms a volatile oxide above 1280° F, and rhodium oxidizes superficially at about 1460°F. The rhodium oxide decomposes at about 2190°F.

Rhenium—This is an extremely refractory metal. It is not affected by hydrogen or nitrogen at high temperatures and is unique in not forming a carbide.

Tungsten oxidizes rapidly at red heat in air and acquires a porous oxide coating. Hydrogen and nitrogen are not absorbed in appreciable amounts, but carbon is — it

forms a hard metal.

Titanium—Coatings of titanium oxidize superficially up to 1640°F, but oxygen is absorbed above 1290°F. It hardens and embrittles the coating. In nitrogen, a tough coating of titanium nitride forms.

Columbium and tantalum may be vapor plated by hydrogen reduction of their chlorides. Some oxygen and carbon can be removed from a basis metal during coating to form a hard brittle interface.

Superficial oxidation of the coating in air occurs below 750°F. This oxide is protective up to about 1470°F where it becomes porous. Nitrogen is taken up at higher temperatures. Tantalum-nickel alloy is tough and corrosion resistant. A flash coating of nickel on steel is helpful before vapor plating with tantalum.

Zirconium — Oxygen, nitrogen and carbon react unfavorably with zirconium plates. Oxygen diffusion into zirconium is appreciable only at 1470°F and above. Nitrogen is absorbed more slowly. Carbon monoxide and carbon dioxide react with the metal at 1470°F.

The refractory nature of high-melting nitrides can be of full use only in nonoxidizing atmospheres of nitrogen. Titanium, zirconium and hafnium carbides are stable in air at 930 to 1470°F, but molybdenum and tungsten carbides are oxidized. With nitrogen, vanadium and tantalum carbides are decomposed near the melting point and molybdenum and tungsten carbides are unaffected.

Borides—Coatings of borides applied by vapor plating have extreme hardness and some resist oxidation to 1830-2470°F, although superficial oxidation may occur at lower temperatures.

Zirconium boride is fairly oxidation resistant to 2650°F and titanium boride to 2730°F, although a thick oxide film forms.

Silicides—Vapor plated refractory silicide coatings will provide oxidation protection at temperatures up to their melting points—1830 to 3630°F. The oxidation products contain the nonvolatile, refractory oxide, silica.

Siliconized molybdenum filaments heated in air at 3090°F have a life of more than 1000 hours. Uncoated molybdenum fails in sec-

Oxidation Temperatures of Prospective Coating Metals

Coating	Melting Point °F	Methods of Application	Temperature of Rapid Oxidation °F
Aluminum	1220	Hot dipping, metal spraying, aluminum paint plus heat diffuse, electroplating, vapor plating	932 to 2012*
Chromium	3434	Electroplating, vapor plating	2012 to 3090
Cobalt	2723	Electroplating, electroless plating (chemical reduction), vapor plating, spraying	1472 to 2012
Gold		Electroplating	
Iron	2802	Electroplating, vapor plating, spraying	932 to 1472
Nickel	2651	Electroplating, electroless plating, vapor plating, metal spraying	2012 to 2552
Niobium (Columbium)	4379	Vapor plating	932 to 1472
Platinum	3223	Electroplating, vapor plating	Above 3092
Rhenium	5738	Electroplating, vapor plating	932 to 1472
Rhodium	3571	Electroplating, vapor plating	Above 3092
Silicon	2606	Vapor plating	2012 to 2552
Tantalum	5432	Vapor plating	932 to 1472
Titanium	3308	Vapor plating, electroplating, (fused salt)	2012 to 2552
Tungsten	6170	Vapor plating, electroplating (alloys)	1472 to 2012
Vanadium	3155	Vapor plating	1472 to 2012
Zirconium	3326	Vapor plating	2012 to 2552
Chromium-nickel alloy**		Electroplating plus diffusion, vapor plating	Up to 2100
Chromium-aluminum alloy**		Vapor plating, electroplating plus diffusion	
Chromium-aluminum-nickel alloy**		Vapor plating, electroplating plus diffusion	Up to 2100
Gold-chromium alloy**		Electroplating plus diffusion	Up to 1800

*Aluminum usually fails by erosion rather than oxidation. By alloying to form an aluminum-iron compound, an aluminum coating can resist oxidation up to 2110°F for a short time, as demonstrated by its use as a coating on V-2 rockets.

**Temperature limits are estimates.

Source: "Protective Metallic Coatings" by Charles L. Faust.

Oxidation Rates of Electroplates in Air

(1800°F in mg/cm²/hr)

	Total Exposure (hours)		
	10	50	100
Electroplates			
Chromium	0.7		0.28
Chromium-6% iron alloy	0.6		0.20
Chromium-18% iron alloy	0.6		0.26
Cobalt	7.2		
Cobalt-27% tungsten alloy	5.8		2.8
Nickel	1.0		0.32
Nickel-20% chromium alloy (diffusion of multilayer plates)	0.35	0.12	0.10
Possible Electroplates			
Gold	None	None	None
Nickel-18% chromium-2% aluminum (wrought)		0.01	
Nickel-16% chromium-4% aluminum (wrought)		0.02	
Platinum (wrought)		0.01	

Source: "Protective Metallic Coatings" by Charles L. Faust.

onds. Maximum resistance results when the coating has the composition $MoSi_2$. Failure at higher temperatures occurs apparently because of silicon diffusion into the molybdenum.

By modification in alloy coating, oxidation resistance above 3600°F can be secured. Silicide coatings of titanium, zirconium, columbium, tantalum and tungsten show good resistance to oxidation up to 1830-2020°F, but not as good as molybdenum disilicide.

Interfacial Zone—The interfacial zone between the base metal and its protective coating can make or break the composite, explained Dr. Faust. Adherence of coatings is important. Bond strength encompasses more than adherence and has more significance for coated materials at high temperatures than at ambient atmospheric conditions.

Before applying a protective coating, the basis metal surface must be cleaned. Three types of cleanliness are involved—physical, chemical and mechanical. Each affects the integrity, adherence and bond strength of the coating.

Alloy Zone—The formation of an alloy zone can be a benefit or a detriment, according to the combination of basis metal and coating, and time and temperature in service, stated Dr. Faust. For instance, nickel coating on zirconium needs interfacial alloying for good adherence.

Iron can be used as an intermediate coating for diffusion-alloying-and-bonding intermediate. Alloying with zirconium takes place in 5 to 15 minutes.

Aluminum Coat—Alloy formation at the interface may determine whether aluminum can be used to protect titanium. Unalloyed titanium is not affected by aluminum coatings up to 600°F. After 3 hours at 1100°F, diffusion of aluminum into the titanium decreases the bend and tensile ductility of thin sections. Aluminum coatings improve the short time oxidation resistance up to 1800°F. Aluminum coating is a prospect for structural titanium below 1000°F and for nonstructural titanium above 1000°F, said Dr. Faust.

The high-temperature diffusion rate of chromium coatings on steel is influenced by the carbon content of the steel—the smaller the carbon content, the larger the diffusion rate. Surface decarburization or the presence of strong carbide formers, such as titanium, columbium and vanadium, prevents formation of the chromium carbides which act as a diffusion barrier.

Hard Layer—The chromium diffusion layers are harder as carbon content increases. On cast iron, the surface is hard enough to cut glass. Chromized steel can be rolled, bent, pressed, heat treated and quenched without damage to the coating.

This shows the good properties of the diffusion alloy chromium surface. Such surfaces can be brazed, silver soldered and welded by normal methods. Welds made with austenitic stainless steel are not subject to corrosion.

Intermediate Coat—Molybdenum diffuses rapidly through a chromium coating and a nickel-chromium diffusion alloy coating. But a chromium-gold-chromium intermediate plate prevents outward diffusion.

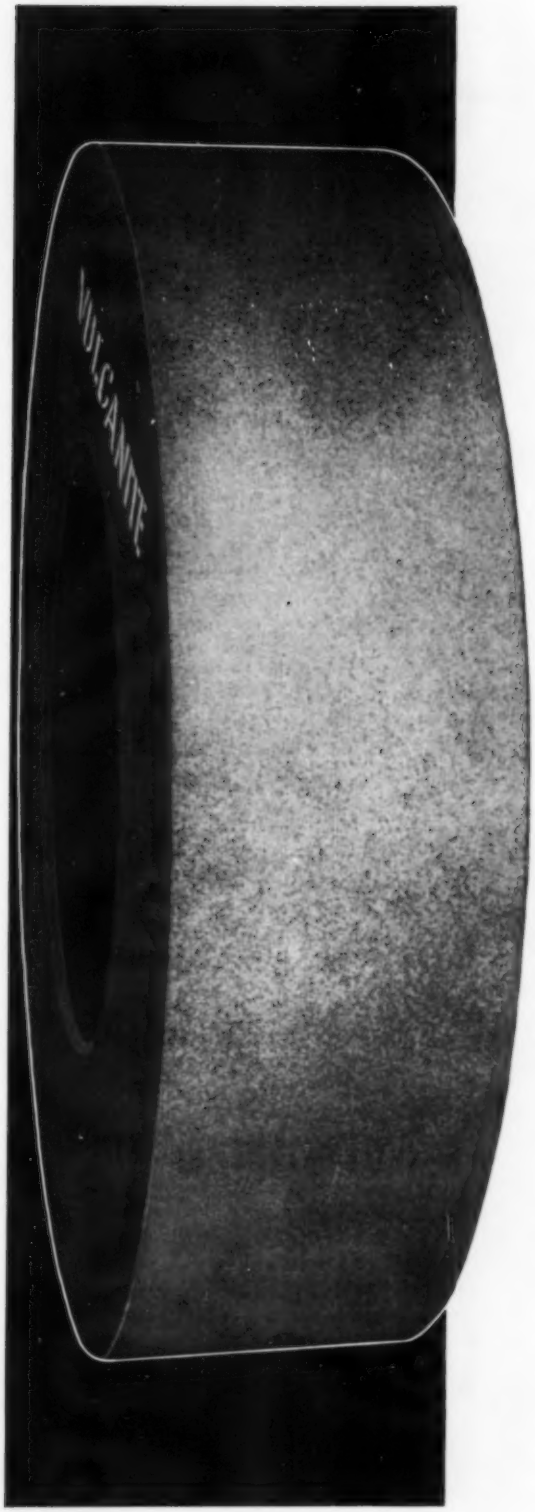
Cadmium coating on steel gives good protection up to about 500°F. Danger of intergranular attack of the highly stressed steel begins at 611°F, when cadmium melts. The use of a thin nickel plate as a barrier layer coating prevents stress corrosion cracking by the cadmium plate on low alloy steel parts for jet engines up to 1000°F.

Alloying—Coating metals that have melting points below the temperature of service, or which form low melting point eutectics by alloying with the basis metal, can be useful if alloyed to raise the melting point.

Otherwise, such coatings will need an intermediate barrier to intergranular attack or to diffusion alloying, Dr. Faust explained. Chromium-nickel coatings show good oxidation resistance and protection on molybdenum. However, the temperatures needed for diffusion alloying of nickel and chromium layers may be too high for use on other basis metals.

Diffusion alloying can be a great help in cladding steel with a corrosion or oxidation resisting coating. Sheets of stainless and Inconel are nickel plated for diffusion bonding to steel during hot rolling. Further diffusion alloying at high temperatures is no detriment.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*



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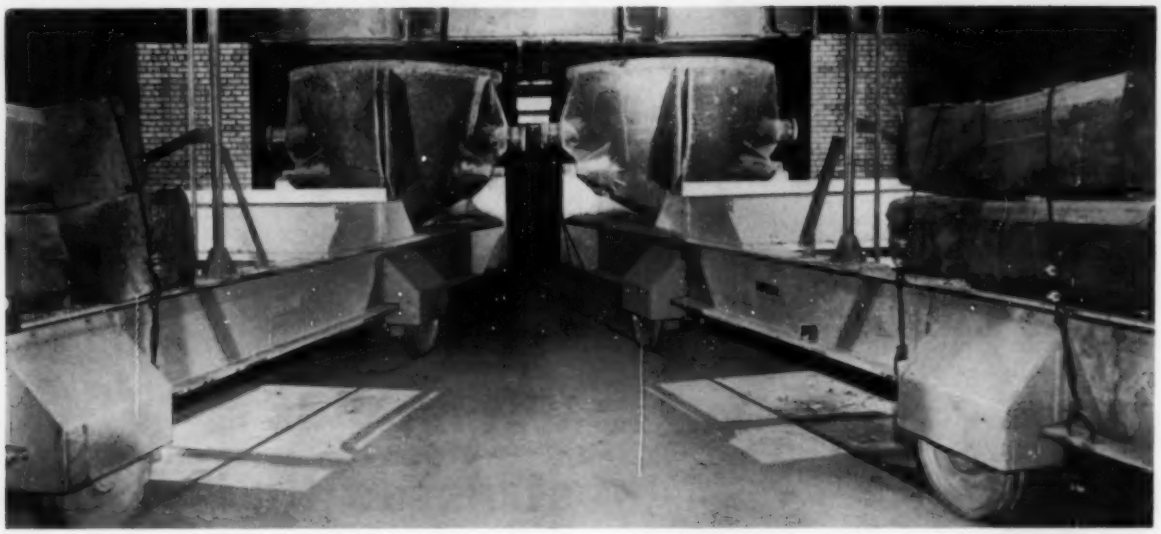

Slag cars for Weirton's 600-ton open hearth operate on converging tracks. Both cars can be used simultaneously for front flushing of slag, then moved individually under the furnace to catch any dripping at tap hole when the bifurcated spout is removed. The center ladle stand is removable. After tapping, it is lifted out of the way and the cars moved one at a time to the pouring aisle so that the crane can lift off the slag ladle. Trunnion cradles on the cars are set at an angle so that ladle trunnions are always parallel to the furnace face and the crane hooks. Blaw-Knox Co. made the slag cars, doors, reversing valves and ladle additions feeders

Open Hearths Grow Bigger

Weirton is tapping a 600-ton furnace, rated at 29,000 tons per month output. Hourly production should average 45 tons and hit 60-ton per hour peaks

NO. 14, Weirton Steel Co.'s 600-ton open hearth, is living up to expectations. Since tapping its first heat on Dec. 22, it has consistently produced over rated capacity. Loftus Engineering Corp., the builder, rates it the biggest in the world.

The furnace is of substantially conventional design. Size alone puts it in a class by itself and makes possible several features aimed at high production.

Dimensions — Over-all, the furnace measures 111 x 30 ft. The bath is 75 ft long, 18 ft 6 in. wide and 46½-in. deep at the center. With metal at the sill line, it will handle 675 tons without difficulty. The seven charging doors have 6 x 5 ft 2 in. openings.

The two checker chambers each have a heating surface of 38,600 sq ft, and exhaust to 8 x 10 ft flues. Reversing valves have 8 x 8 ft bottom openings and 3 x 8 ft top openings. The stack, with an inside diameter of 10 ft, towers 250 ft high.

Refractories—The main roof is entirely sprung; roofs over the slag pockets, fantails and regenerators are suspended. The center line of the main roof is horizontal end to end (there's no dip at the port ends). It is of silica brick except for zebra construction along the back wall. The back skew block was eliminated by building the back skew channel on an angle so that the arch butts directly against it.

Slag pockets have a basic veneer for long life. They can be easily cleaned with mechanical equipment. The chimney-type checkers are clay brick superduty at the top and first quality stiff mud below.

Boiler—The waste heat boiler is a water tube type instead of a fire tube type. Sequential steam soot blowers in the boiler clean the tube banks and superheater. The heavier particles drop into hoppers in the bottom of the boiler while the lighter particles are carried out through the stack. Flue dust from these hoppers is transferred to one of two bucket elevators which discharge into side dump cars outside the building.

Another unusual feature is the slag car arrangement which permits simultaneous use of two cars for front flushing of slag. Even though the doors are larger than usual, the furnace will be charged for the time being with the same 42 cu ft charging boxes used on Weirton's other furnaces.

Tapping — Ladles and ladle stands are the same as for No. 1 and No. 13 furnaces. Tapping is handled conventionally—into two ladles through a bifurcated spout, but ladle additions have been mechanized. Two vibratory ladle addi-

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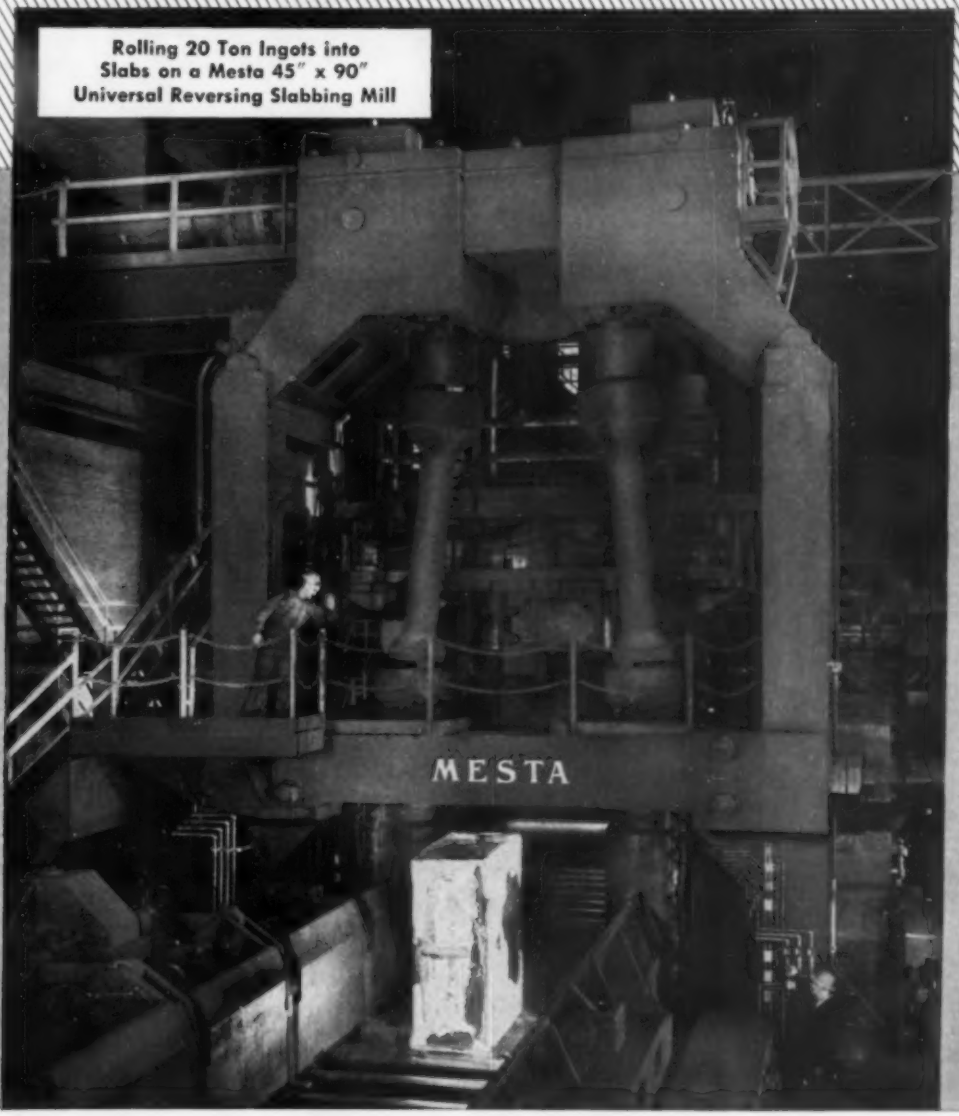

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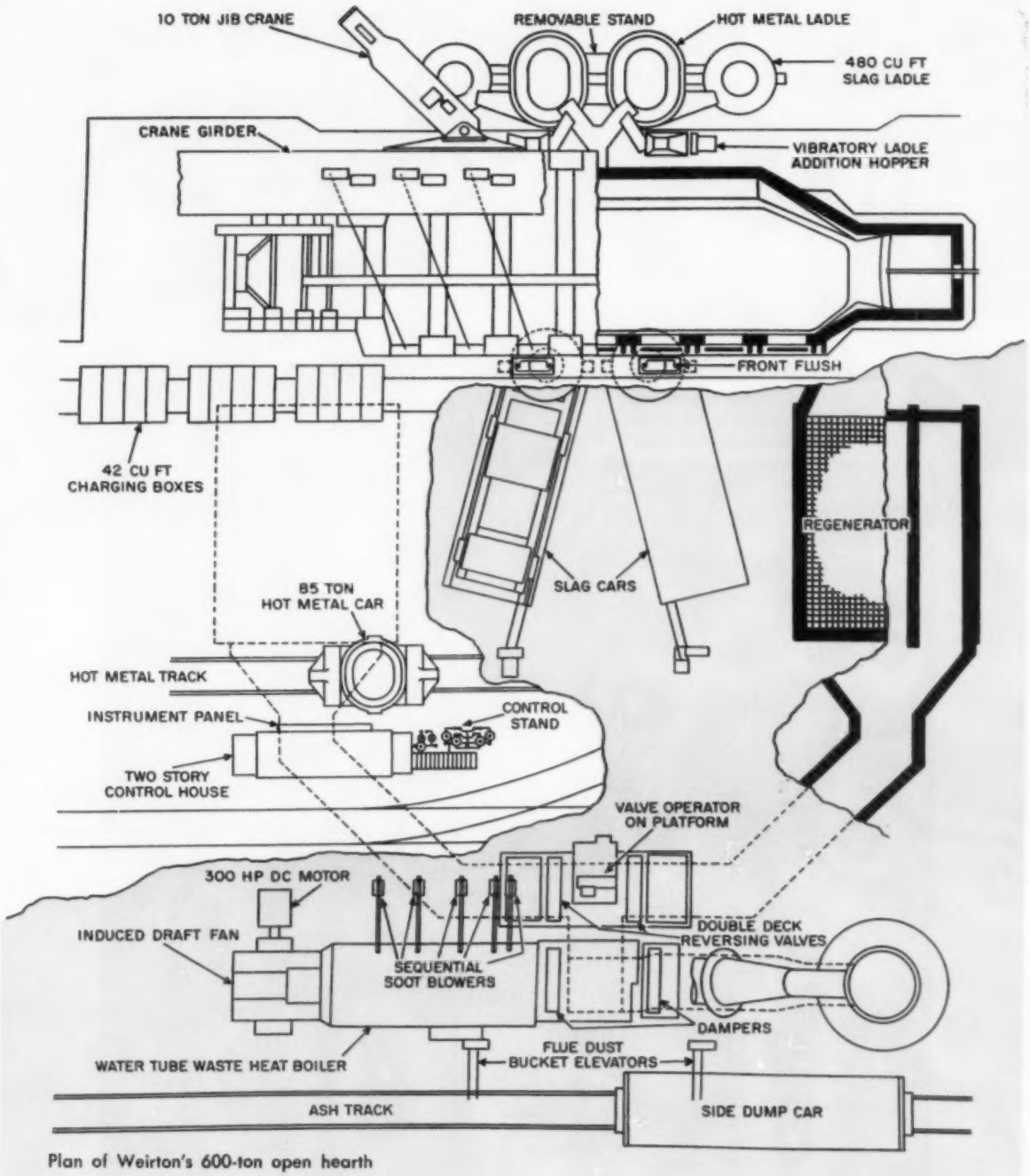

Plan of Weirton's 600-ton open hearth

tion hoppers were ordered with the furnace. One is in use, the other temporarily in reserve pending modifications in the back platform.

Fuel can be oil or pitch. Oxygen is used for fuel-air enrichment and for through-the-doors lancing, but not through the roof.

Furnace reversal is automatic and can be initiated by time, temperature difference or maximum temperature. Two Rayotubes for controlling roof temperature switch automatically to record the hot end, and reduce fuel input when the temperature exceeds a safe maximum. A panel alarm signals when any vital service, such as air or fuel, gets out of safe range and indicates immediately where the trouble lies.

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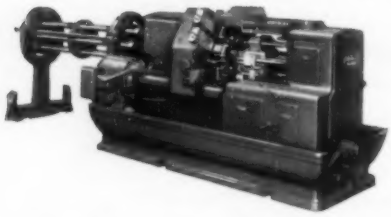

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Numerical Controls Tested

Two large milling machines have undergone Air Force acceptance tests in the last two weeks. A third gets its preview in Detroit and is ready for shipment

AIR FORCE acceptance tests have just been completed on the first of its large order of numerically controlled profile and contour milling machines.

The first was held the week of Apr. 8 at the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. It was a high speed test run on the G&L skin mill that's controlled by a Numericord magnetic tape system. (STEEL, Jan. 21, p. 68)

Punched Tape — Kearney & Trecker Corp., Milwaukee, did the second test last week. It was run on the first of 22 K&T is building for the Air Force.

The machine operates from digital information punched on a plastic tape. The machine is actuated in three directions by signals generated from the coded information that defines workpiece shape.

K&T engineers use high speed digital computers to process the data for the motion control. The control system was developed and built by Bendix Aviation Corp., Detroit.

The engineers say the machine can be used to mill high tensile steel as well as aluminum. Feed rates are 1/50 to 100 in. a minute. The spindle is powered by a 20-hp motor and has a range of 36 to 1800 rpm.

Preview

Coincident with the AF acceptance tests, Bendix and Glenn L. Martin Co. executives teamed up to stage a preview of the Bendix-built milling machine to be delivered to Martin.

This machine also is numerically controlled. It was built at Bendix's research laboratory near Detroit. Because of its size, it was moved to the Eckerly Tool & Mfg. Co., Farmington, Mich. It soon will be installed at Martin's Baltimore division.

Cross Expands

Cross Co., Detroit, has moved its manufacturing and office operations to its new plant. It brings all operations under one roof and triples available space.

The plant is designed for the production of automation equipment. Modular construction was used to make growth easier.

Cycle Time Cut

To boost their production of carbide burrs and cut the production cost, engineers at Atrax Co., Newington, Conn., developed an automatic grinder, controlled by cams.

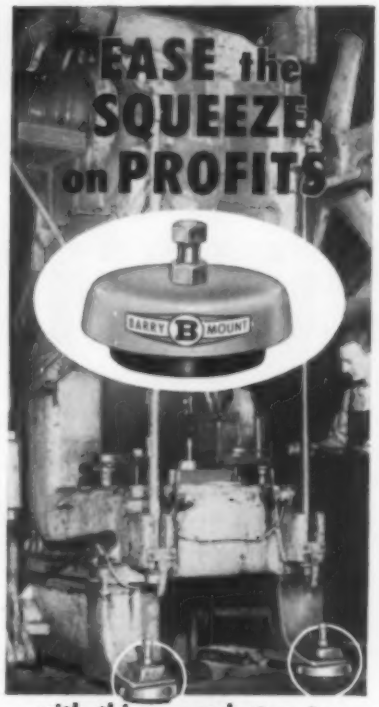
The machines automatically grind carbide blanks to size and shape. Wet grinding with a diamond wheel under water coolant permits each flute to be ground from the solid on one pass.

The engineers say they have reduced machining time on many jobs by more than 75 per cent.

Quality—Atrax spokesmen cite a further advantage to the new machines. By performing the operation automatically, they feel, it helps them increase precision and uniformity of tools. They say it leads to increased burr life due to the finer finishes and closer tolerances held on the workparts.

BDSA Pushes Deliveries

Machine tool builders are working under a new directive from the Business and Defense Services Administration, Department of Commerce. While it does not change the percentage of the industry's production to be earmarked for the military, it insures that within the military allotment top priority goes to the most urgent programs.



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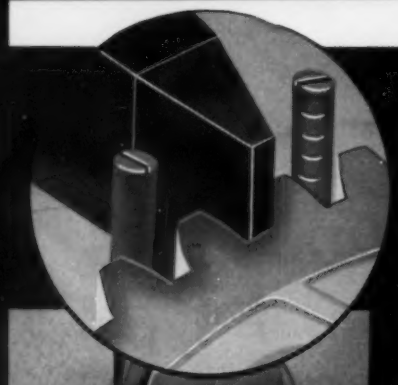

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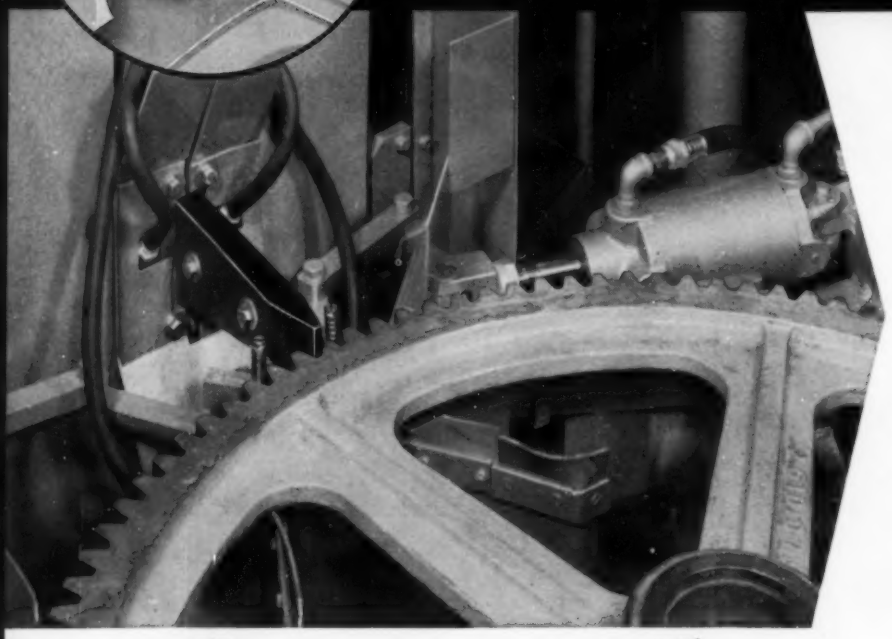

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Heat treating the critical root zone makes an appreciable difference in physical properties and fatigue strength.

With high frequency induction heating, the tooth can be full hard for maximum wear resistance. Large gears can be hardened with small capacity equipment.

Scanning eliminates the need for inductor change with varying gear face widths. Automatic controls, including indexing and quenching, result in a high production rate and uniform results.

This is one type of gear hardening. Size and production rate dictate to a great degree the type of equipment. Whatever your need in gear hardening or other heating applications, Magnethermic's experience with induction heating can be useful.

Prompt response to your inquiry — Magnethermic, Youngstown, Ohio.

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EQUIPMENT

Numerical Controls Tested

Two large milling machines have undergone Air Force acceptance tests in the last two weeks. A third gets its preview in Detroit and is ready for shipment

AIR FORCE acceptance tests have just been completed on the first of its large order of numerically controlled profile and contour milling machines.

The first was held the week of Apr. 8 at the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. It was a high speed test run on the G&L skin mill that's controlled by a Numericord magnetic tape system. (STEEL, Jan. 21, p. 68)

Punched Tape — Kearney & Trecker Corp., Milwaukee, did the second test last week. It was run on the first of 22 K&T is building for the Air Force.

The machine operates from digital information punched on a plastic tape. The machine is actuated in three directions by signals generated from the coded information that defines workpiece shape.

K&T engineers use high speed digital computers to process the data for the motion control. The control system was developed and built by Bendix Aviation Corp., Detroit.

The engineers say the machine can be used to mill high tensile steel as well as aluminum. Feed rates are 1/50 to 100 in. a minute. The spindle is powered by a 20-hp motor and has a range of 36 to 1800 rpm.

Preview

Coincident with the AF acceptance tests, Bendix and Glenn L. Martin Co. executives teamed up to stage a preview of the Bendix-built milling machine to be delivered to Martin.

This machine also is numerically controlled. It was built at Bendix's research laboratory near Detroit. Because of its size, it was moved to the Eckerly Tool & Mfg. Co., Farmington, Mich. It soon will be installed at Martin's Baltimore division.

Cross Expands

Cross Co., Detroit, has moved its manufacturing and office operations to its new plant. It brings all operations under one roof and triples available space.

The plant is designed for the production of automation equipment. Modular construction was used to make growth easier.

Cycle Time Cut

To boost their production of carbide burrs and cut the production cost, engineers at Atrax Co., Newington, Conn., developed an automatic grinder, controlled by cams.

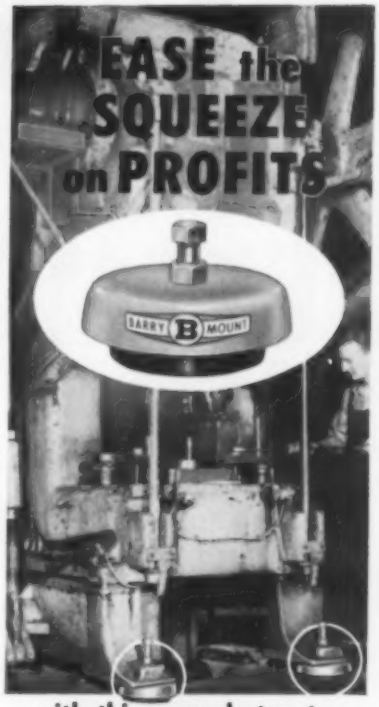
The machines automatically grind carbide blanks to size and shape. Wet grinding with a diamond wheel under water coolant permits each flute to be ground from the solid on one pass.

The engineers say they have reduced machining time on many jobs by more than 75 per cent.

Quality—Atrax spokesmen cite a further advantage to the new machines. By performing the operation automatically, they feel, it helps them increase precision and uniformity of tools. They say it leads to increased burr life due to the finer finishes and closer tolerances held on the workparts.

BDSA Pushes Deliveries

Machine tool builders are working under a new directive from the Business and Defense Services Administration, Department of Commerce. While it does not change the percentage of the industry's production to be earmarked for the military, it insures that within the military allotment top priority goes to the most urgent programs.



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3 NEW SUPER-PRODUCTIVE AUTOMATICS

3 MACHINE SIZES

Spindle Capacities	New Speed Ranges
¾"	5050 to 25 R.P.M.
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1½"	2450 to 17 R.P.M.

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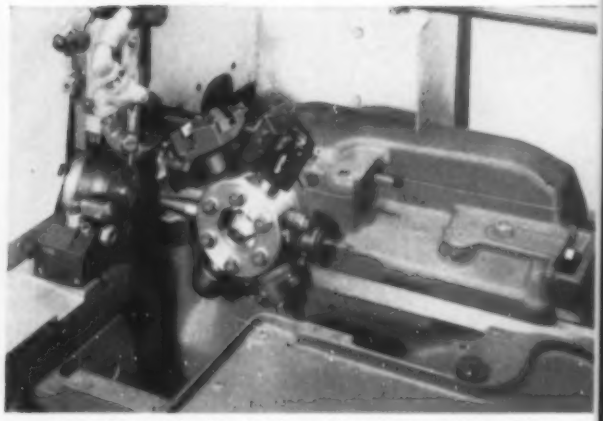
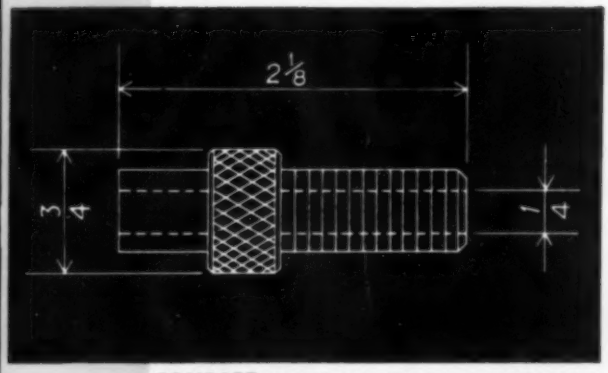
Super-Precision spindle with antifriction bearings reduces radial and thrust play to an absolute minimum. Powerful, positive chain drive delivers full power at all speeds, giving maximum tool life on all materials.



Super-Precise hardened and ground steel ways and cross slides maintain lasting, precise alignment with spindle . . . permit consistent dimensional accuracy to 0.0005" and longer tool life.

Three New No. 2 Automatic Screw Machines

cut production time, boost accuracy on stock up to 1½" diameter



COMPARE PRODUCTION TIME FOR THE ABOVE PART

	Seconds Per Piece	
	Brass	B-1113 Steel
Previous Design Machine	15	120
New No. 2	11	67½

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36% in Brass
76% in Steel

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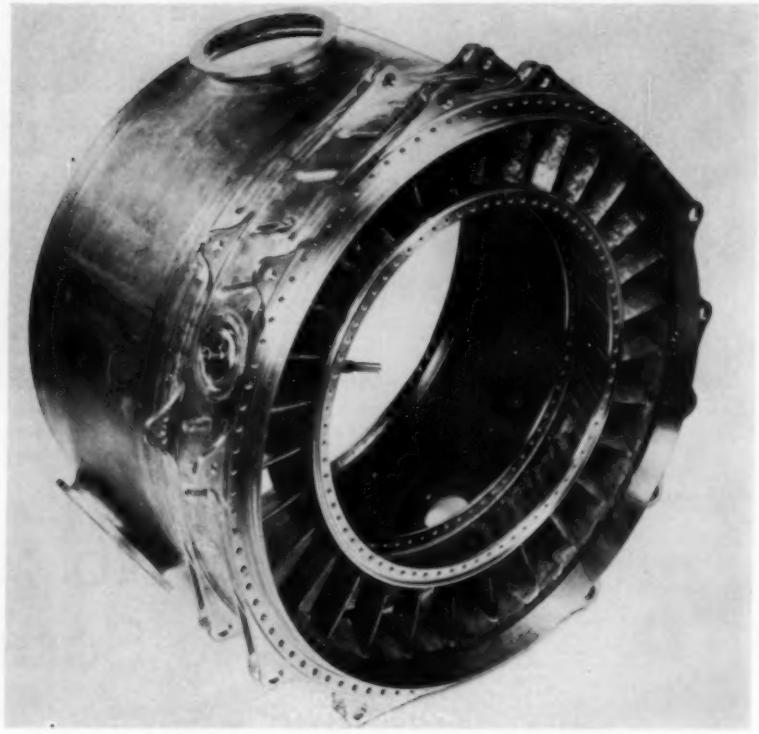


Three prototype assemblies built by Thompson Products involved nearly every metalworking operation. Engineers had to develop new techniques for some processes

Titanium Fabrication from A to Z

HOW would you fabricate the titanium intermediate compressor case shown above? The jet engine assembly calls for at least 15 precision processes.

After turning out three prototype assemblies made of Rem-Cru A-110-AT, development engineers in the Jet Division of Thompson Products Inc., Cleveland, feel they've licked most of the basic problems of working titanium and are ready to tackle the tough ones.

Vanes—Assembly of the case begins by joining a series of vanes between two circular shrouds. In a conventional compressor case, vanes are investment cast stainless steel. The hollow vanes for the titanium assemblies were made by welding sheet to rough contour machined bar stock.

The high shrinkage strains that remained after welding created a forming problem. If all strains were not removed, the sheet thinned out at the weld joint.

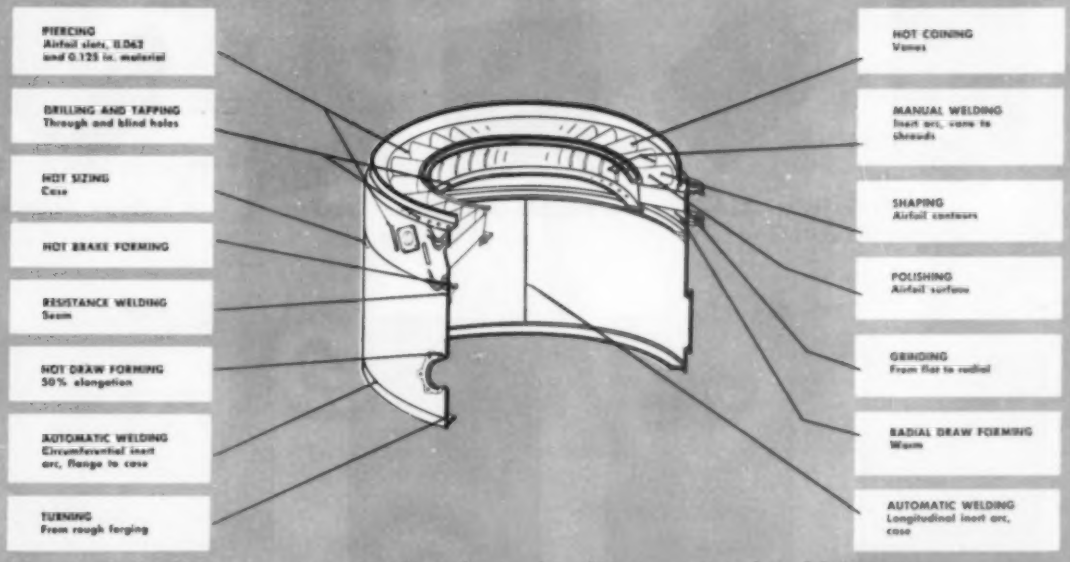
Hot Coining—"We found hot coining to be the best solution," explains D. P. Cryor, project engineer on the job. The cambered vanes were coined in a flat die setup that was electrically heated to 1200°F. Press load was 1 ton.

"Hot coining of titanium has proved consistent and effective," adds Mr. Cryor.

Shrouds—The vanes are joined to the inner and outer shrouds by manual inert arcwelding. The inner shroud is a forged ring which has been slotted for the vanes. The outer shroud is 0.062-in. sheet which is shaped by hot brake forming and warm radial draw forming. The air baffle was shaped by the same process.

Slots in the outer shroud were pierced at room temperature. Punch and die clearances were about half those used for stainless steels.

Although both shroud and baffle can be brake formed at room temperature, metallurgical studies revealed severe deformation twinning of the material. To eliminate this, blanks were resistance heated to 1150°F before forming.



Titanium intermediate compressor assembly and examples of processes it took to fabricate it

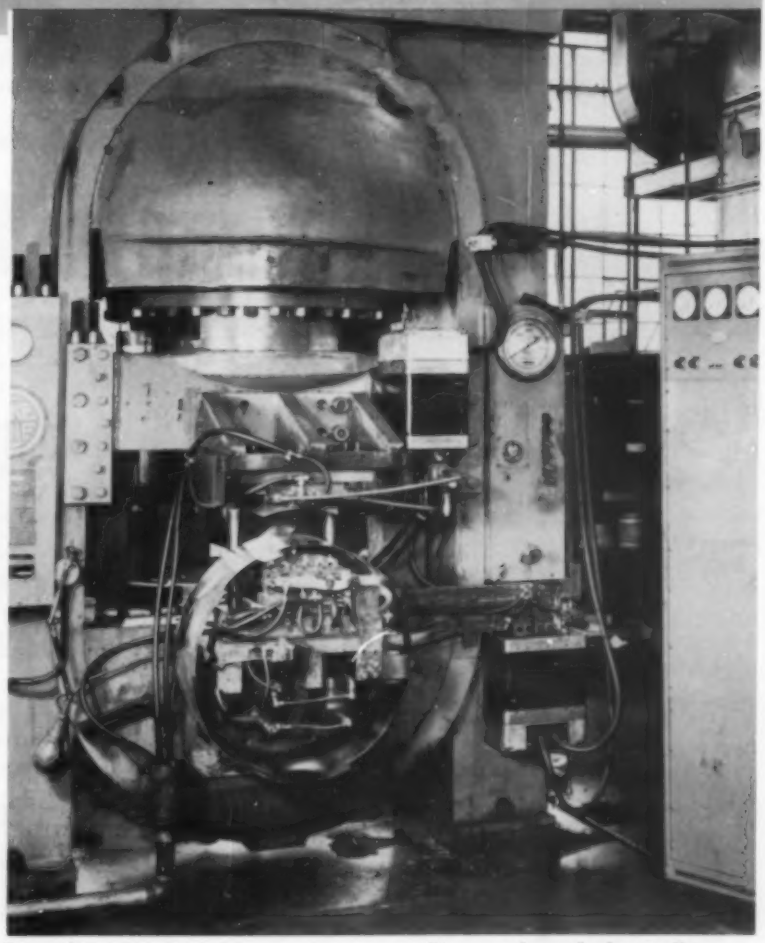
Radial Drawing — Metallurgically, heat was not required to radial draw form the parts. Variable dimensional results, however, led to the development and use of a heated die. Dimensional control studies resulted in an optimum die temperature of 300°F.

Radial draw forming is a combination stretch-compression process which tensions the material to its yield point; then compression wraps the part around the die.

Rear Outer Case—One of the most remarkable developments in fabricating the assembly was the draw forming of the ports in the rear outer case. The material undergoes a 50 per cent elongation and is formed on a bend radius as small as 2½-times the thickness of the metal.

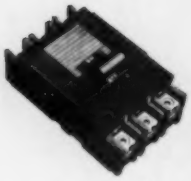
The rear outer case is fabricated in two halves which are welded together. Each half contains two flanged ports—one is 6.685-in. in diameter, the other 2.970 in.

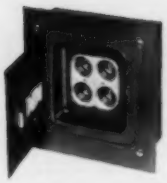
Five essentials evolved in the development of the port drawing process — surface preparation, forming temperature, forming



Deep draw operation on rear outer case. Dies are heated electrically

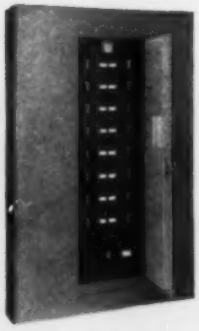
• Safety Switches and Industrial Circuit Breakers





• Fusible and Circuit Breaker Load Centers

• Voltage Testers



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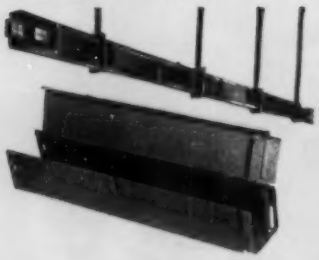
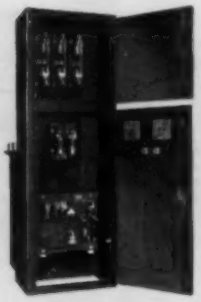


• Busways and Wireways



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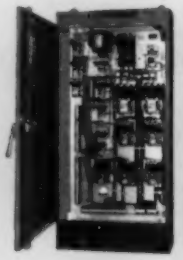

• Special Purpose Control

• Control Centers

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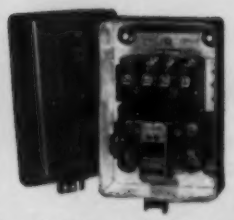
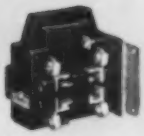
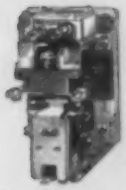
• A.C. Manual and Magnetic Starters



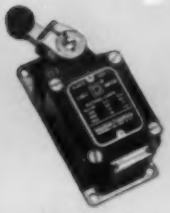
• Drum Switches



• Control Relays

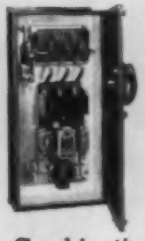


• Timing Relays



• Limit Switches

• Pushbuttons



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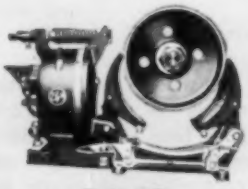

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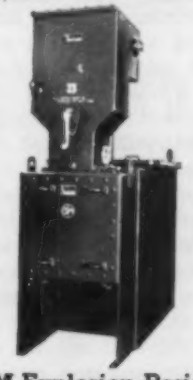
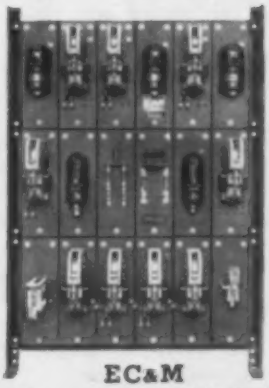


EC&M Explosion-Resisting Control for Petroleum Industry



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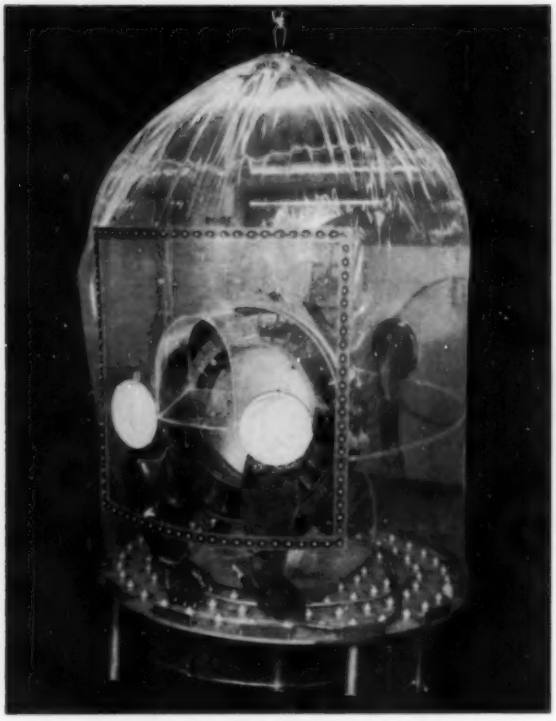
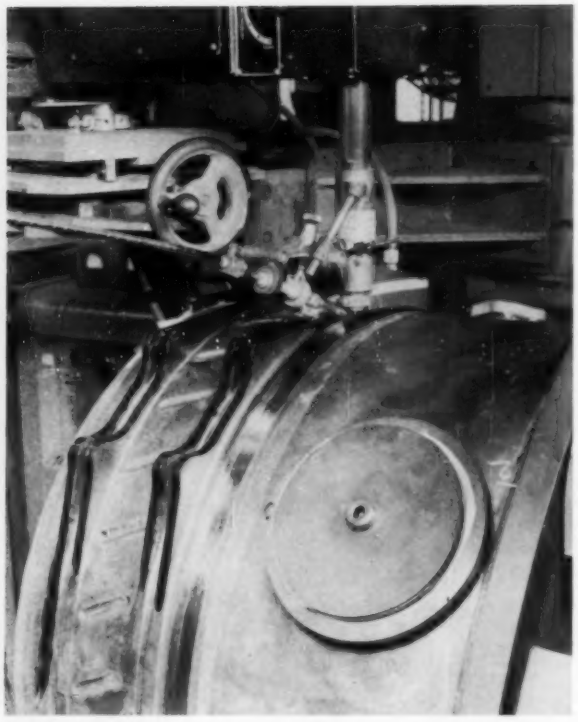


Plastic enclosure used for manual welding. After loading the fixtured assembly, the tent was purged with argon



Close-up of automatic circumferential weld of front to aft case in final assembly

FABRICATING TITANIUM . . .

rate, die design and the use of a developed pilot hole.

Surface—It was necessary to polish sheet surfaces on both sides with strokes running across the direction of the rolling mill finish. It also was necessary to radius and polish the machined edges of all holes before forming.

Where metal thickness was not uniform, all high spots within the area to be formed had to be filed and hand polished.

Temperature—Most satisfactory forming results were obtained in the 1000 to 1100°F range. Yield strength of the alloy decreases sharply above 1000°F and at the 1300°F level there is danger of atmospheric contamination.

Test pieces run at 1400°F and above failed in tension during forming. The 700 to 1000°F range gave inconsistent results.

Forming Rate—Much of the success in forming A-110-AT depends on moving material slowly and without interruption. Thompson development engineers formed the alloy at 1½-ipm ram speed.

The ideal rate of forming, says Mr. Cryor, is a function of material temperature, forming die temperature, material thickness, forming lubricant, surface finish of dies and material and the degree of deformation required.

Equipment—All forming was done in a hydraulic press with electrically heated dies. A work pressure of about 2 tons was required. To maintain close temperature control, the upper and lower die sections were connected to separate power units—each had its own load transformer, powerstat and operating controls.

For economy, the dies were built from ordinary mild steel. After test runs and die development were completed, the heavy wear surfaces were machined away and replaced with stainless steel inserts to insure satisfactory life for production requirements.

Pilot Hole—The use of a developed rather than a round preform pilot hole was an important step in the development of the process. No successful draws were made before the use of the developed hole.

Machining, grinding and polishing were important to the completion of the assembly. Airfoil surfaces of the vanes were contour milled and polished. The front case was turned from a rough forging.

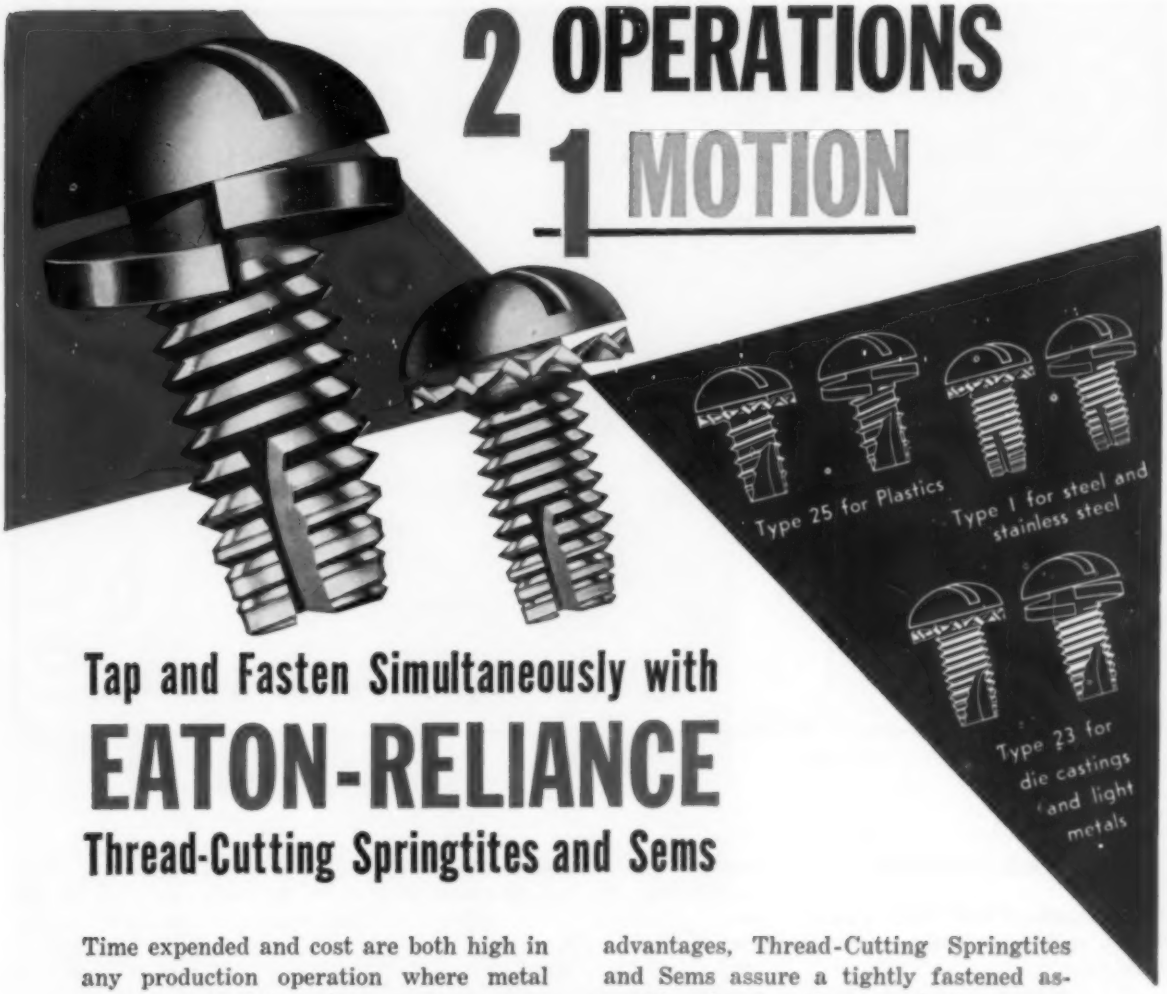
Coolants—Engineers found that oil-base coolants were not effective in machining titanium. They also were a fire hazard. Water-base coolants had to be used.

For drilling and tapping the 96 blind holes in the assembly, sharp tools were essential and dwelling of tools had to be eliminated. Dwelling caused work hardening.

Welding—There are more than 20 types of welded joints in the titanium intermediate compressor case. Both manual and automatic methods were used.

Mechanically, titanium is not particularly difficult to weld, explains Mr. Cryor. There are no unusual problems in joint design,

2 OPERATIONS 1 MOTION



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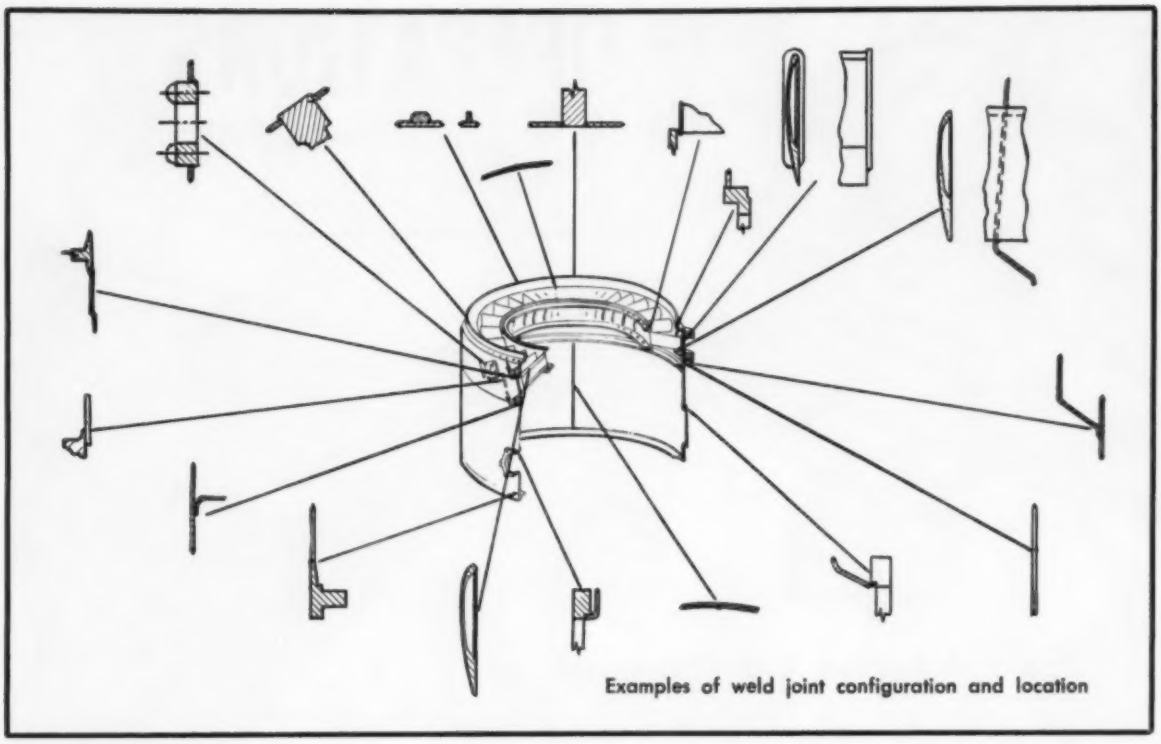

Examples of weld joint configuration and location

FABRICATING TITANIUM . . .

heats, speeds or wire feeds in making a well filled and penetrated weld bead.

The problems in welding titanium involve: 1. The metal's high affinity for atmospheric constituents. 2. Shrinkage stresses due to the transformation from cubic body centered to the hexagonal body centered structure, combined with the proximity of the ultimate to the yield strength of the material. 3. Porosity.

Atmosphere—Unusual techniques and precautions are necessary to protect the molten weld puddle from atmospheric contact. All welding of the titanium case assembly was done by the tungsten, inert gas, shielded arc method except for one joint, which was a resistance seam weld.

To gain experience and to develop the techniques required for this project, Jet Division engineers tried welding the assembly "in the open" and in inert gas enclosures. Both were successful on this job.

Enclosure—A general purpose plastic tent was constructed and used in the development work. After loading the fixtured assembly into it, the tent was purged with argon. Dew point readings were taken periodically until a $-50°F$ reading was obtained. Purging times ranged from 1 to 2 hours.

Another precaution used was to strike a test bead for visual examination of color as one indication of contamination before welding the part. Dew point readings and test beads continued at intervals throughout welding of the assembly.

Manual—With manual welding "in the open," extreme care must be taken in:

1. The backup gas setup. 2. Careful purging of air with the inert gas to insure against corners of trapped air that may diffuse into hot zones of the weld. 3. The use of carefully designed trailer shields on the welding torch. 4. Elimination of drafts in the welding area. 5. Maintaining the hot end of the weld wire in the gas envelope at all times. 6. Cleanliness of parts, fixtures and weld wire.

Automatic—All automatic welding was done in the open, using trailer shields on torch heads and fixturing to include inert backup gas. To avoid weld porosity, development engineers followed this procedure:

1. Pickle the part if there is an oxide film (bluish or light yellow discoloration) on the surface. If not, a normal degrease is sufficient.

2. Polish sheared edges that are to be welded with 180-grit paper. Draw filing also is effective.

3. Be sure joints are smooth and square.

4. Good fitup is important. When no filler rod is used, butt joints tightly.

5. High heat in the weld proved effective in decreasing porosity. This can be done by using high current and mild steel (rather than copper) backup bars.

6. Rapid cooling of the weld tends to increase porosity.

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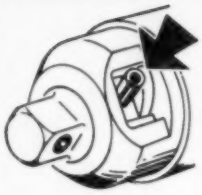
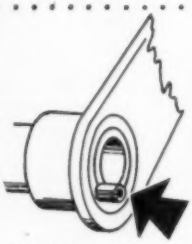
Phone: HUbbard 1-3200

Rollpin® replaces 12 different fasteners

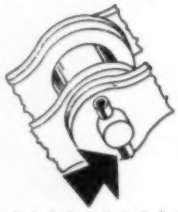


REPLACING A GROOVED PIN . . . in this application, Rollpin serves as a stop pin in a ratchet wrench adaptor. With its light weight and high shear strength, Rollpin functions perfectly . . . cuts assembly costs.

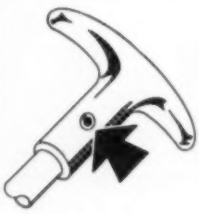


REPLACING A KEY . . . Rollpin demonstrates its ability to do away with precision tolerances, in this heating system damper arm. Faster, cheaper and more satisfactory than previous assemblies.

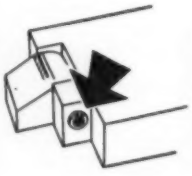
REPLACING A RIVET SHAFT . . . Rollpin serves as an axle for the sparkwheel of a cigarette lighter. No riveting or threading necessary . . . faster assembly. Note flush, clean fit.



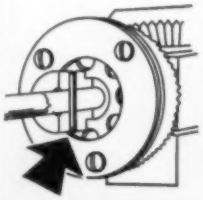
REPLACING A COTTER PIN . . . Rollpin assembly time is shorter, service life ten times longer. Vibration-proof flush fit. Easily removable.



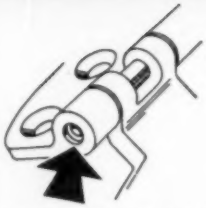
REPLACING A SET SCREW . . . to fasten automobile brake handle a short length Rollpin is self-retained in the hand grip but can easily be driven into over-drilled hole in shaft for simple handle removal.



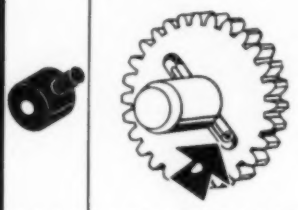
REPLACING A CLEVIS PIN . . . here Rollpin holds firmly in clevis, permits free action of moving member. Rollpin application shown is the plate of a home workshop tool.



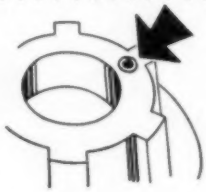
REPLACING TAPER PINS . . . in the assembly of precision differentials eliminated cost of taper pin reamers and the entire reaming operation. Rollpin costs less than a taper pin and installation is cheaper. They remove easily.



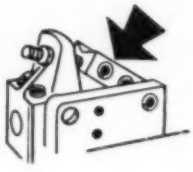
REPLACING A HEADED PIN . . . in this hinge pin application, Rollpin is simply and inexpensively driven in place, greatly reducing assembly costs. Constant spring tension holds Rollpin firmly in place . . . eliminates loosening of hinge due to wear.



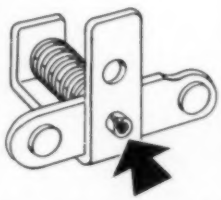
REPLACING A HUB ON A GEAR . . . Rollpin, self-retained in shaft, is simply snapped into molded slot to position sintered gear. This application, by an office equipment manufacturer, effects major savings in assembly. Rollpin's high shear strength is particularly valuable here.



REPLACING A DOWEL PIN . . . Rollpin is used here to prevent rotation of a thrust bearing. No reaming, no special locking. Easily removed. Lowest possible dowel pin cost.

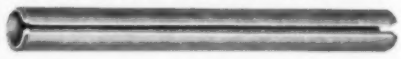


REPLACING A BOLT AND NUT . . . Rollpins act as fasteners and pivots for the linkages in this electric welder. Rollpins may be used with a free fit in outer or inner members depending upon product design requirements.



REPLACING A RIVET . . . Rollpin serves as guide shaft for spring-loaded electrical interlock contacts. This electrical equipment manufacturer reports that rivet failure previously occurred at the clinched end under normal operating impact and vibration.

WHERE CAN YOU USE THIS SIMPLE FASTENER?



Rollpin is the slotted tubular steel pin with chamfered ends that is cutting production and maintenance costs in every class of industry.

Drives easily into standard holes, compressing as driven. Spring action locks it in place—regardless of impact loading, stress reversals or severe vibration. Rollpin is readily removable and can be re-used in the same hole. Made in carbon steel, stainless steel and beryllium copper. Write for samples and information, ELASTIC STOP NUT CORPORATION OF AMERICA, 2330 Vauxhall Road, Dept. R47-460, Union, New Jersey.

ELASTIC STOP NUT CORPORATION OF AMERICA

2330 VAUXHALL ROAD, UNION, NEW JERSEY

ROLLPIN TRADEMARK

Tooling Costs Cut

Throwaway carbide insert tool reduced turning costs and eliminated tool grinding

A CHANGE of tools on a turning operation brought a reduction in operating costs at the Indianapolis transmission plant of Chrysler Corp.

The job, turning the outer diameter of planet pinion carrier housings, is done on a Bullard vertical chucking lathe.

Insert Tool—A Wesson microadjustable throwaway insert tool replaces a conventional single point tool. The nature of the operation made it necessary to reset the tool by gage every time it was sharpened.

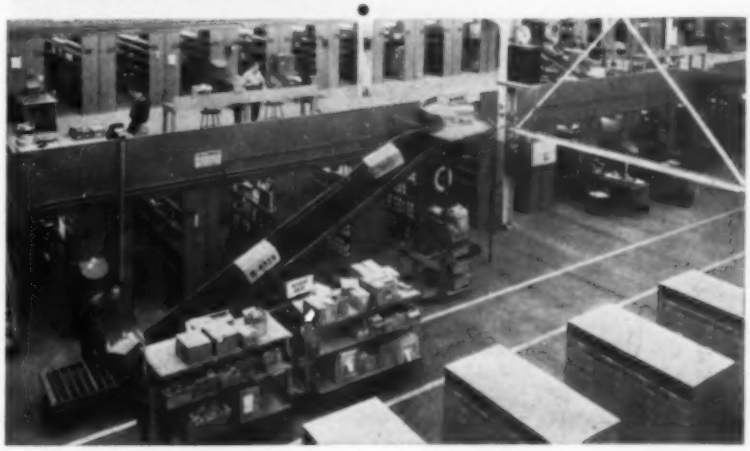
BORING BAR
. . . is adjustable to 0.001 in.

The use of this boring bar with square-ground Wessonmetal GI inserts eliminated the difficulty without any change in operating specification. Speed, feed and depth of cut remained the same. Tool costs dropped $4.04 per 1000 pieces.

Adjustment — Since the only change in tooling is to index the insert or replace it after indexes, no tool change adjustment is required. The microadjustment takes care of the original setup. If resetting is required, the adjustment

Ask Standard

how to cut costs with conveyors



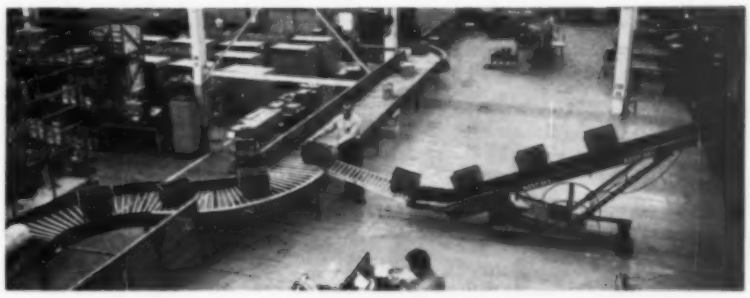
One of two Inclinebelt conveyors that carry parts to reversible live roller conveyor at second level. Belt conveyors are reversible to bring down outgoing parts. Note minimum space used for conveyors.

Multi-level conveyors help Douglas Aircraft CUT STORAGE AREA BY 2/3

When it's difficult to spread out — look up! That's what the El Segundo Division of Douglas Aircraft did when confronted with the need to triple the capacity of a parts stockroom facility.

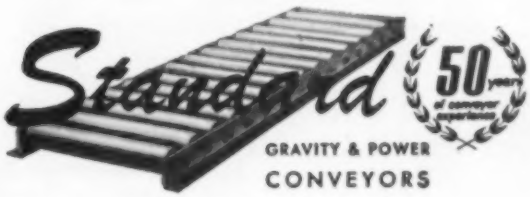
Today, instead of stocking parts on one level, they're using three. Movement of parts in and out of all three levels is quick, simple and efficient. They're doing it with Standard conveyors.

This relatively simple solution to what could have been a difficult problem is one example of how Standard Conveyors pay off in every industry. STANDARD CONVEYOR COMPANY, North St. Paul 9, Minnesota. Sales and Service in Principal Cities.

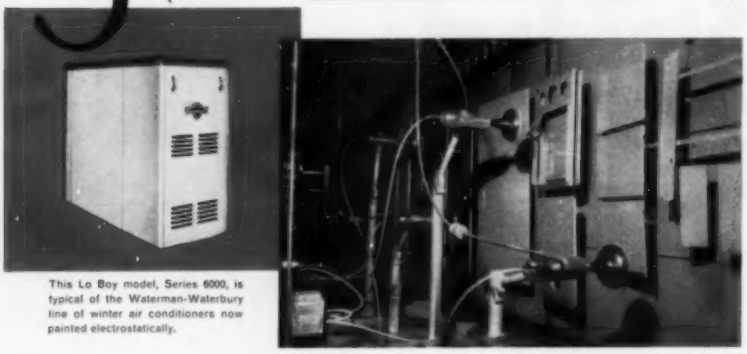


Third level is reached via portable Handibelt conveyor from reversible live roller conveyor. Patented easy-adjustment features of Handibelt permit quick reversing of flow.

For details on Standard Conveyors, help in selecting the right type and size to meet your needs, contact the Standard representative listed in your classified phone book or write direct. Ask for Bulletin Y-4.



3 times as many Furnace Casings per gallon of paint with **RANSBURG NO. 2 PROCESS!**



This Lo Boy model, Series 6000, is typical of the Waterman-Waterbury line of winter air conditioners now painted electrostatically.

Quality of work is improved; Labor costs are cut and Production Stepped up 150% with

RANSBURG Electrostatic Spray Painting

Results exceeded expectations when Waterman-Waterbury, Minneapolis, modernized their finishing department and went from hand spray to Ransburg No. 2 Process in painting their quality line of heating and air conditioning equipment.

By the former hand spray method, W-W used a half gallon of paint to coat a single casing. Now, with Ransburg No. 2, they get SIX CASINGS PER GALLON . . . or 3 times as many per gallon. Furnace casings, as well as other painted parts which go into the famous Waterbury Furnaces, now get a uniform coating of .8-mil.

Production was increased, too, as automatic painting enabled them to step up the conveyor speed from 7 fpm to 11½ fpm. Where they formerly turned out a complete furnace in five minutes, NOW they assemble three in just six minutes . . . an increase of 150%. All in all, they figure the modernization program—with Electro-Coating—saved over $11,000 in the first three months of operation.

NO REASON WHY YOU CAN'T DO IT TOO!

Whatever you paint, we'd like to tell you more about the efficiencies and worthwhile savings which can be yours with Ransburg Electro-Coating Processes. Get our No. 2 Process brochure which cites many on-the-job examples of electrostatic spray painting on a wide variety of products. Or, we'll be happy to loan you our new film, "The Big Attraction" which tells the electrostatic spray painting story in sound and full color.

Call or write

RANSBURG
Electro-Coating Corp.
Barth and Sanders, Indianapolis 7, Indiana

TOOLING COSTS CUT . . .

is turned one division for every 0.001 in. needed.

Indexing time of less than 60 seconds represents a saving of about 9 minutes in down time per tool change. In addition, shutdowns for tool changes are needed only about half as often with the carbide. Total down time for tool changes is now about 7 per cent of the former average.

Hidden Costs—If this application had been analyzed only on the basis of initial tool cost, it is doubtful that the switch would have been made. There is little difference in tool cost per piece.

The hidden costs were in regrinding and down time.

Results of Tool Change

Carbide	GI
Cutting speed	Unchanged
Feed rate	Unchanged
Cycle time	Unchanged
Depth of cut	Unchanged
Pieces per tool change	Up 90
Grinds or indexes per tool	Down 10
Initial tool cost per 1000 pieces	Down $0.04
Grinding cost per 1000 pieces	Down $4.00
Total tool cost per 1000 pieces	Down $4.04

Hot Cracking of Type 347

Sporadic base-metal hot cracking and weld-metal hot cracking sometimes are encountered in welding heavy sections of the columbium-bearing Type 347 steels.

Results of research in this area have been published in a 12-page booklet titled "Further Studies on Stainless Steel Hot Cracking." It supports the hypothesis that grain-boundary liquation is responsible for base-metal hot cracking.

Findings for a Type 347 heat (previously found most susceptible to hot cracking) were compared with those for a standard Type 304 heat (which was not susceptible).

You can order the study from the Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C., for 50 cents.

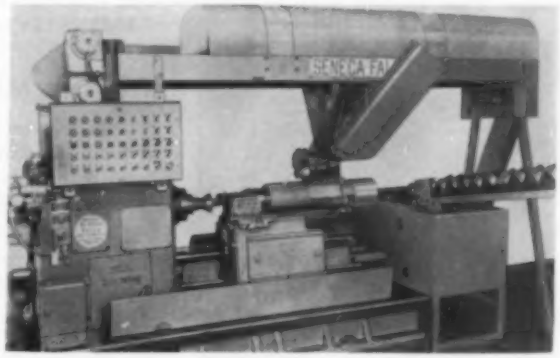
Transfer Mechanism Automates Lathes and Grinders

Model VHM is an automatic loader and transfer machine which brings automation to machines that operate on automatic cycles and can be loaded from above.

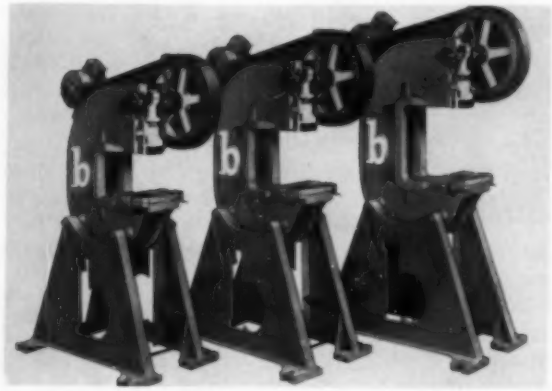
A 3-hp motor drives the loader through two clutch shafts. One shaft transmits the axial movement to the loader carriage. The other revolves the drum cam which raises and lowers the loader and unloader arms.

All movements are synchronized by a camshaft which operates in timed relation to the rotation of the drum cam.

Loader fingers are controlled by contact buttons which operate the latching mechanism. *Write*: Seneca Falls Machine Co., Seneca Falls, N. Y. *Phone*: 701



This Line of Presses Has Deep Throats



Each of these three presses has a rated capacity of 10 tons.

Three shut heights are available. Measured from the bed to the slide with the stroke down and the adjustment up, they are 7¾, 10¾ and 13¾-in.

The standard stroke is 1¼-in. Strokes of 1½, 2, 2½ and 3 in. are available with corresponding reductions in shut heights.

The presses operate at 180 to 190 strokes a minute and are powered by ¾-hp, 1140-rpm motors.

All models are 12 in. from the center of the slide to the frame. There is a 5-in. opening between columns. Bed area is 8 x 11 in.

The presses weigh about 1000 lb. *Write*: Benchmaster Mfg. Co., 1835 W. Rosecrans, Gardena, Calif. *Phone*: Plymouth 6-8134

Lift Truck Removes Rolling Mill Bearing Chocks

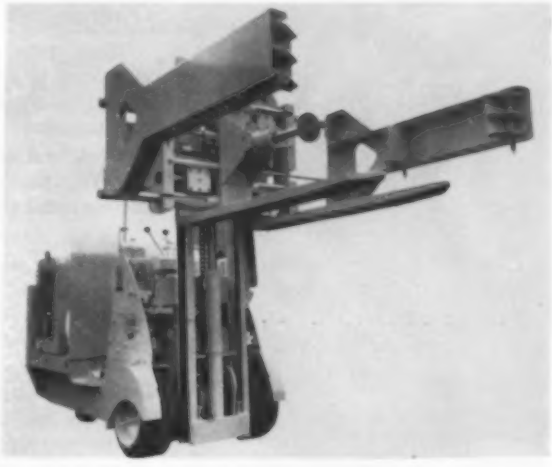
The Skylift LF-80 is an industrial fork lift truck with an attachment which removes or replaces work roll bearing chocks.

With this unit, one man can remove these 3200 to 4000-lb bearing chocks. The truck is run up to the chock, and its weight is taken off the roll neck with the truck's forks. At the same time, the chock is clamped on the sides with gripping arms.

A hydraulic pushing ram is powered against the roll neck. This frees the bearing chock from the roll.

The fork spread is adjusted hydraulically to remove the coupling, and push-pull shoes on gripping arms are set at any of 14 positions to suit the bearing's size.

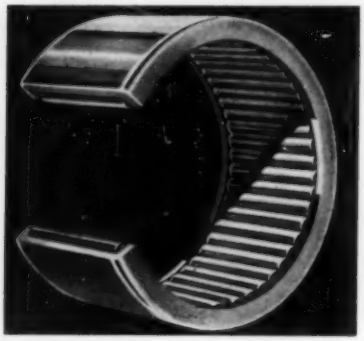
After the worn rolls are ground, the chocks are serviced and installed on the roller by using the truck. *Write*: Automatic Transportation Co., division of Yale & Towne Mfg. Co., 149 W. 87th St., Chicago 20, Ill. *Phone*: Radcliffe 3-7000



NEW PRODUCTS and equipment

Roller Bearings

The Thin-Shell needle roller bearing uses rollers with spherical ends. They present a smooth sur-



face contact with the shell.

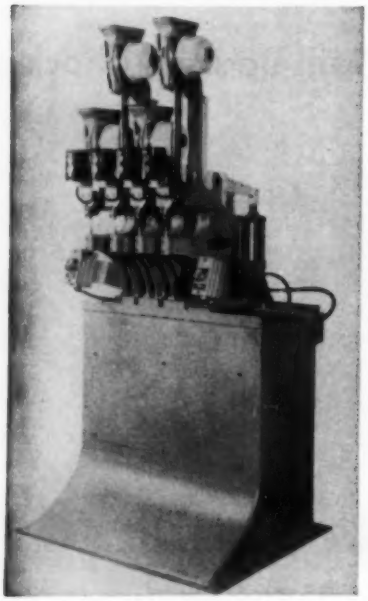
Rollers are held in the shell by a special purpose grease that withstands shipping and handling. *Write*: Kaydon Engineering Corp., McCracken Street, Muskegon, Mich. *Phone*: 5-1641

Riveting Machine

Model FS is a pneumatic machine for simultaneous riveting operations on long, flat parts.

It sets tubular steel rivets which are 0.06 in. in diameter and 3/32-in. long to ⅛-in. in diameter and 9/16-in. long.

The machine can be made with



two to six or more heads, each fed by an automatic hopper.

Throat depth is 7 in. Other dimensions: stroke, 1¼-in.; anvil height, 40 in.; minimum center distance between heads, 3.67 in. *Write*: Milford Rivet & Machine Co., Milford, Conn. *Phone*: Trinity 8-1761

Transfer Machine

This 53-station machine is 62 ft long. It drills, spotfaces, chamfers, reams, line reams, taps, mills and bores 80 cast iron sliding gear transmission cases an hour.

The cases are turned 90 degrees at the 13th station and tipped up 90 degrees at the 38th station. The design avoids use of vertical machining units.

The machine is made of 13 segments; each has separate pushbutton controls and panels which per-

mit independent part clamping, machining and unclamping for setup and repair operations.

Gaging devices that probe drilled holes before tapping are included on the machine. *Write*: Snyder Tool & Engineering Co., 3400 E. Lafayette, Detroit 7, Mich. *Phone*: Lorain 7-0123

Chip Separator

Work done on automatic screw machines is separated from chips with up to 99 per cent efficiency by this machine.

Work and chips are placed in a vibrating loading pan which passes the material over a sloping screen.

An air blast blows the chips upward while allowing the work to fall and pass out to a discharge chute which delivers it to tote pans or a belt conveyor.

The design of the hood eliminates air blast back pressure and prevents the chips from flying out of the machine. Either a container or a belt conveyor can be used

to collect the chips. *Write*: Ransohoff Inc., N. Fifth street at Ford boulevard, Hamilton, O. *Phone*: 3-5813

Heat Marking Crayons

Altex Hi-Heat crayons are made in ten colors that will withstand 900 to 1200°F. The solid marking crayons can be used on all types of hot metal, including those later stored outside. *Write*: Ace Laboratories, 1614 Coutant Ave., Lakewood 7, O. *Phone*: Academy 1-5358

Slitting Shear

Model 1025 is a rotary shear that slits 24 to 10 gage sheets or coil stock at speeds up to 60 fpm.

The throat of the machine is

25 in. deep, and the minimum width of cut is 1½-in.

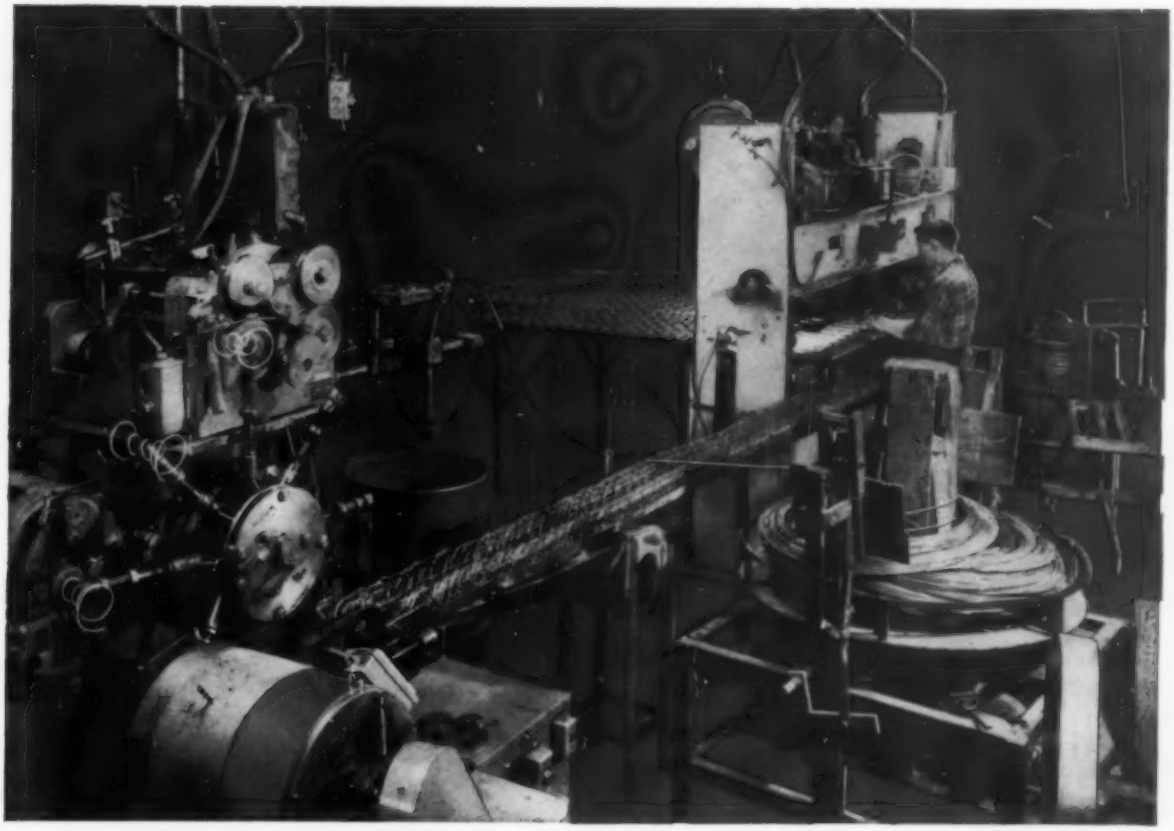
Height can be adjusted from 32 to 36 in. *Write*: Flagler Corp., 19321 Filer Ave., Detroit 34, Mich. *Phone*: Twinbrook 3-3161

Assembly Machine Welds

Welding, assembly, testing and machining operations are combined in this automated machine.

The seven-station machine assembles and welds a flange to one

Double cone springs are produced automatically on this Wunderlich special high speed automatic coiling and knotting machine at the Ohio Mattress Company, Cleveland, Ohio. Machine coils, crimps, knots and heat treats springs made from 13½ gage Mastercraft spring wire, supplied in 600 lb. bundles.



UNIFORMITY OF J&L WIRE

speeds spring production

J&L spring wire reduces number of rejects, increases production, in modern automatic operations. One reason is that every bundle of spring wire is produced to closely controlled tolerances.

Rigid quality control assures uniform physical and dimensional characteristics. Every coil of famous Mastercraft, hard-drawn MB or Electromatic oil-tempered MB spring wire is thoroughly tested.

Try this superior Jones & Laughlin spring wire. You'll find it's tops in quality, competitive in price.

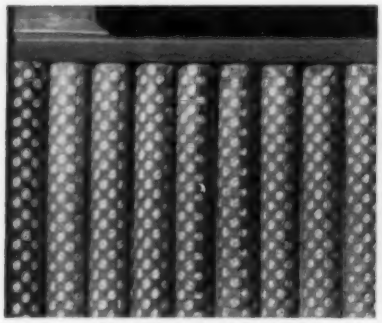
Call your J&L representative or write to the Jones & Laughlin Steel Corporation, Dept. 404, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

Jones & Laughlin STEEL ... a great name in steel

Get more work from your

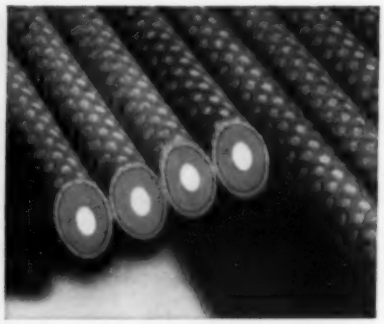
NEW TG EXIDE-

NEW POSITIVE AND NEGATIVE PLATES – DEVELOPED



New tubular construction of positive plate! Armored porous tubing. Provides resistance to corrosion and effects of vibration, improved flexibility, and maximum retention of active material. Thousands of tiny openings mean...

Greater porosity. Highly permeable tubes ease current flow, reduce internal resistance, improve access of electrolyte. Battery will deliver more power to meet sudden heavy loads. Tubes hold ...



More active material. Chief source of battery power. Larger inside diameter of tubes means every positive plate contains more active material per cubic inch of plate. And for maximum capacity and long life, there's a ...

electric industrial trucks

IRONCLAD BATTERY

Want more work hours—no increase in battery size? You get 44% more capacity in the new TG Exide-Ironclad Battery. For example, you can replace a 500 ah battery with a 720—in the same size. This means your trucks can do more work. They can earn a great deal more on your investment in them.

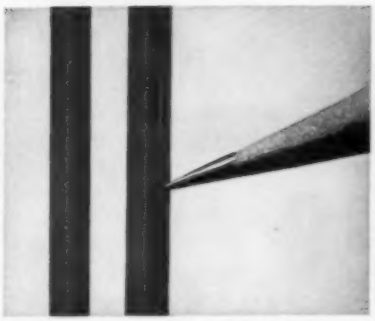
Satisfied with the work capacity of your present battery? Then get it at the lowest cost to own and operate—and get the newest, most advanced electric industrial truck on the market today.

Packs 44% more power into same battery space . . . priced to give you even greater battery economy

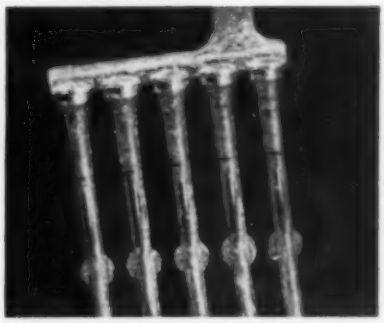
Want even lower operating cost and improved performance from your electric industrial trucks? Here Exide makes it possible. The new TG Exide-Ironclad Battery combines challenging new materials with an ingenious overall new design to produce the highest capacity per cubic inch of any battery available today. It's the most dramatic increase in capacity and the biggest step forward in power per dollar in history. This new battery can benefit every user of electric industrial trucks.

Learn more about the operating and expense advantages. Call your nearby regional Exide representative. Or write for complete information. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 1, Pa.

OUT OF RESEARCH STARTED 15 YEARS AGO



Thicker negative plate. Specially designed to match the increased capacity of the new positive plates. Plate is both thicker and stronger and possesses better electrical characteristics. You get all these advantages . . .



Plus Silvium,* Exide's exclusive grid alloy—proved more corrosion resistant than other leading grid alloys. Silvium is a patented combination of metals designed to prolong battery life. **U.S. patent*

Exide®

The Electric Storage Battery Company

Five reasons why Townsend Versa-rivets* give you superior fastening

Townsend Versa-rivets are versatile, self-plugging blind rivets which can be set easily and rapidly by one man from one side of the work. They save assembly time and allow greater flexibility in product design. Here are the five qualities which mean ideal fastening at lower costs:

1. Strong clinch and resulting high resistance to vibration are obtained with Versa-rivets. In setting them, the shank is expanded against the face of the back sheet, drawing the two sheets together and clinching them effectively, as shown above.

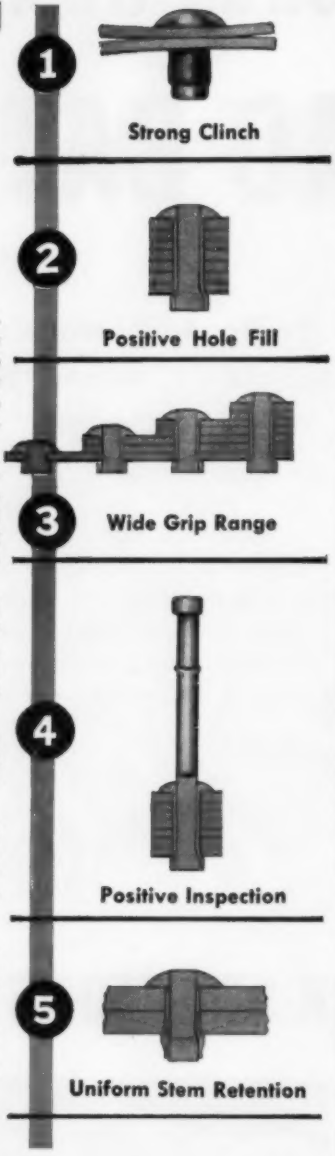
2. Versa-rivets provide a positive hole fill because the stem is drawn down to completely fill the hole in the members being assembled. Sound, strong riveted joints are obtained in holes up to .025″ oversize with shear values comparable to solid rivets.

3. Inventory problems are greatly reduced by the wide grip range as demonstrated above. A single length handles various thicknesses.

4. When the Versa-rivet is set, the enlarged section of the stem protrudes approximately 3/32″ above the rivet head, giving visual indication from one side of the work that the rivet is properly set.

5. The Versa-rivet always provides uniform strength as the stem always adjusts to fill the hole. Stem retention is independent of the hole size and is uniformly high.

If you would like complete details on how Versa-rivets can improve your fastening, write for Bulletin TL-119. Townsend Company, P.O. Box 237-S, New Brighton, Pa.



*Patents issued & pending.

See Versa-rivets Demonstrated At The Design Engineering Show—Booth 1139

The Fastening Authority

Townsend

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New Brighton, Pennsylvania

Sales Offices in Principal Cities

Sherry Rivet Division • Santa Ana, California

In Canada: *Parmenter & Bulloch Manufacturing Company, Ltd., Gananoque, Ontario*

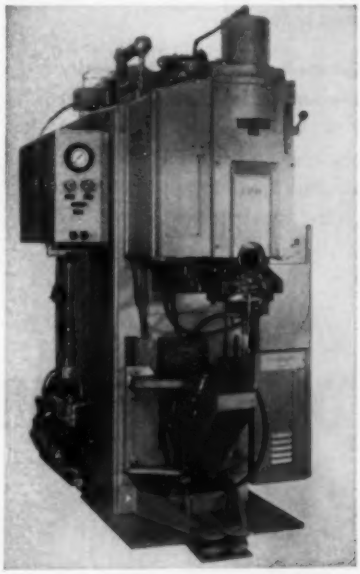
NEW PRODUCTS and equipment

end of a steel tube and does three separate machining operations on the other end. The product: Automotive steering columns. They are tested at the rate of 400 an hour.

Additional stations can be incorporated into the machine without difficulty. *Write*: Expert Automation Machine Co., 17144 Mt. Elliott Ave., Detroit 12, Mich. *Phone*: Twinbrook 1-4327

Spotwelder

Heavy gages of aluminum alloy, heat resisting alloys and stainless and low carbon steels are spot-welded to military specifications by this special Size 4 machine.

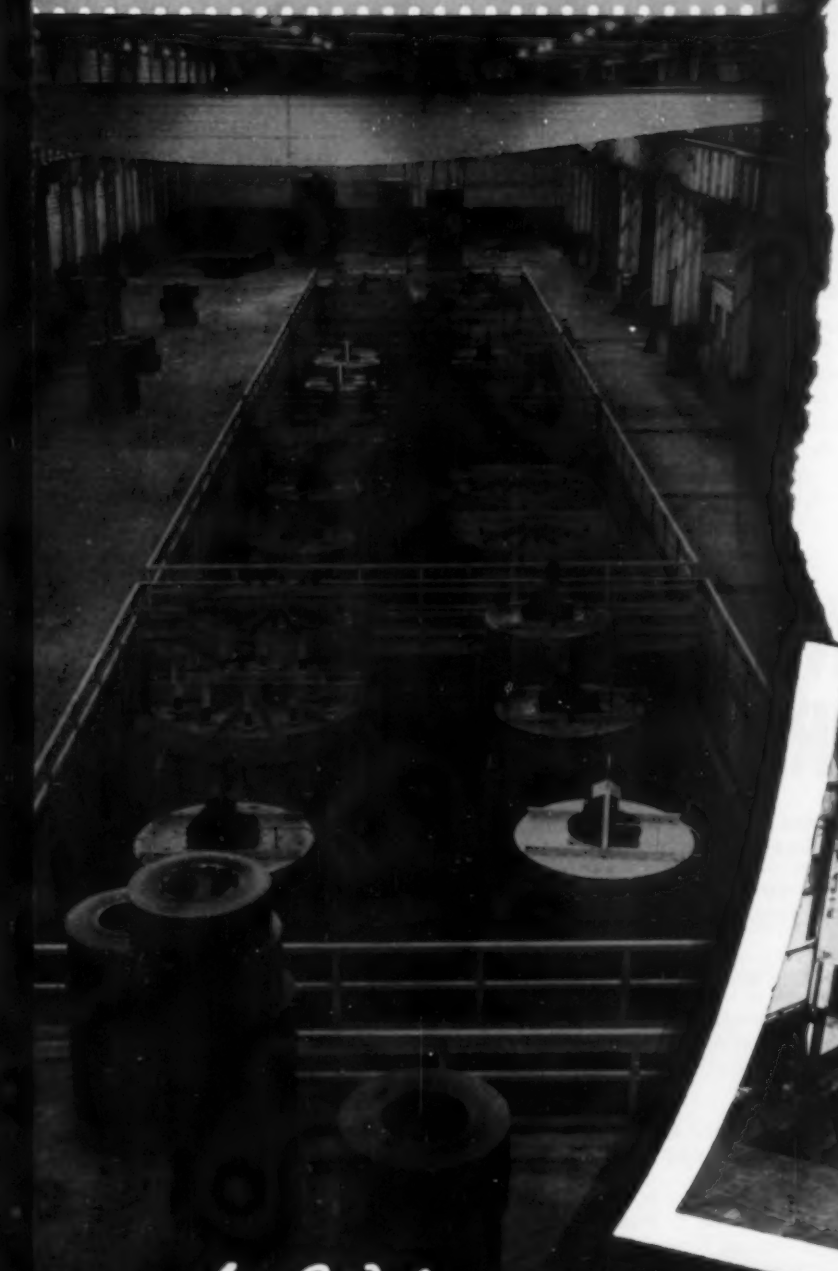


The 200 kva triphase welder is operated hydraulically. It has 18,000 lb of force at a 30-in. throat. *Write*: Taylor - Winfield Corp., Warren, O. *Phone*: 2252-1

Drilling Machine

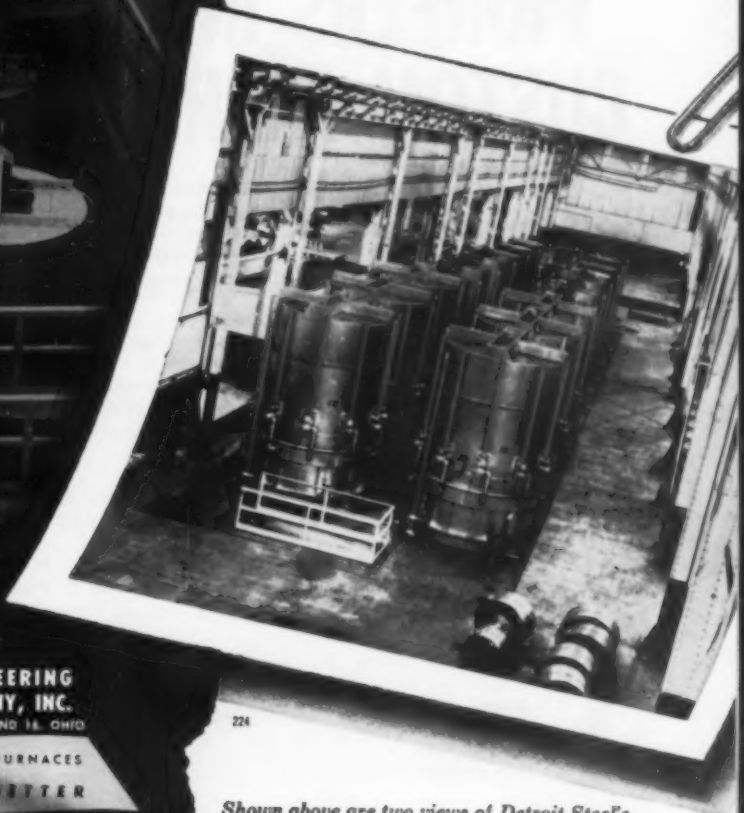
Connecting rods for diesel engines are drilled by this six-spindle machine. It has an automatic torque control device to prevent drill breakage. It withdraws the

Detroit Steel, too, standardizes on Lee Wilson* Single Stack Furnaces



The Detroit Steel Corporation is another of the nation's leading steel producers that has standardized on Lee Wilson Single Stack Annealing Furnaces. In their Detroit, New Haven, and Portsmouth plants, Detroit Steel has found these modern Single Stack Furnaces enable them to make every charge they process a special charge. The flexibility of this Single Stack equipment results in faster deliveries of a wider variety of steel specifications—and, thus, outstanding customer service!

Why not have a Lee Wilson annealing engineer show you how, like Detroit Steel, your annealing practice can be improved by standardizing on Lee Wilson SINGLE STACK Furnaces.



Shown above are two views of Detroit Steel's Portsmouth annealing department. It consists of 18 Lee Wilson Furnaces and 48 bases.

Lee Wilson* ENGINEERING COMPANY, INC.
20005 WEST LAKE ROAD • CLEVELAND 16, OHIO

SINGLE-STACK RADIANT TUBE ANNEALING FURNACES
MAKE THE BEST METALS BETTER

* ORIGINATORS AND LEADING PRODUCERS OF SINGLE-STACK RADIANT TUBE FURNACES

NEW PRODUCTS and equipment

drill for chip clearance when it becomes loaded during deep hole drilling.

Other features: 12 in. ram travel, rapid traverse feed and rapid return, hydraulic feeds. *Write*: Avey Drilling Machine Co., Cincinnati 1, O. *Phone*: Hemlock 1-2986

Contour Mill

The Hydro-Cycle is a hand-guided contour mill that can handle jobs ranging from small forming dies to aircraft components.

The tracer attachment can be furnished with one, two or three-dimensional control.

The machine uses an 18-in. cross-travel and a 12-in. vertical travel. It is available in longitudinal travel lengths of 32, 42 and 48 in.

Spindle speeds are infinitely variable from 40 to 3000 rpm.

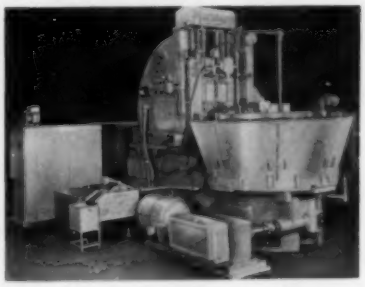
The machine comes complete or as a contour milling unit for building block erection. *Write*: Colonial-Romulus Division, Colonial Broach & Machine Co., Parkgrove Station, Detroit 5, Mich. *Phone*: Jefferson 6-2550

Vertical Gear Shaver

Model V-48 will shave spur, spiral or herringbone gears with a pitch diameter up to 4 ft and surface finish them to 12-15 microinches.

The cutter traverse drive is infinitely variable from 0.034 to 0.188 ipm, using only two sets of change gears. The workdrive also is infinitely variable using only two sets of change gears. Range 1.66 to 241.5 rpm.

An integrated checking fixture mounted on the machine column facilitates checking for spiral pitch and concentricity. The checker is accurate to ±0.0002 in. in 60 in.

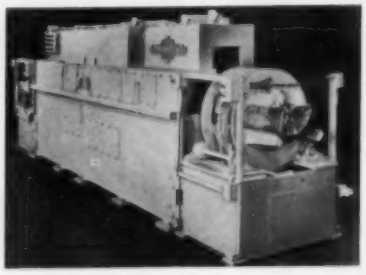


The machine can be equipped with individually adjustable dual heads for simultaneous shaving with two cutters. *Write*: Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. *Phone*: Twinbrook 1-3111

Broacher for Blocks

This tunnel type machine is custom built for automated-line processing of V-8 cylinder blocks. Other machines can be built to handle similar parts.

A turnover positioning unit feeds parts to the horizontal ma-



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- Fabrication of stainless steel, aluminum and other alloys from .020 to 3/16".
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- Acres of machinery for quantity production or prototype development.
- Machinery available for polishing, shearing, bending, drawing, annealing, spinning... other specialized techniques to rigid specifications.
- Blickman know-how makes alloys behave during simple or complex fabricating.
- For specific information regarding your fabricating needs, write S. Blickman, Inc., 7204 Gregory Avenue, Weehawken, N. J.

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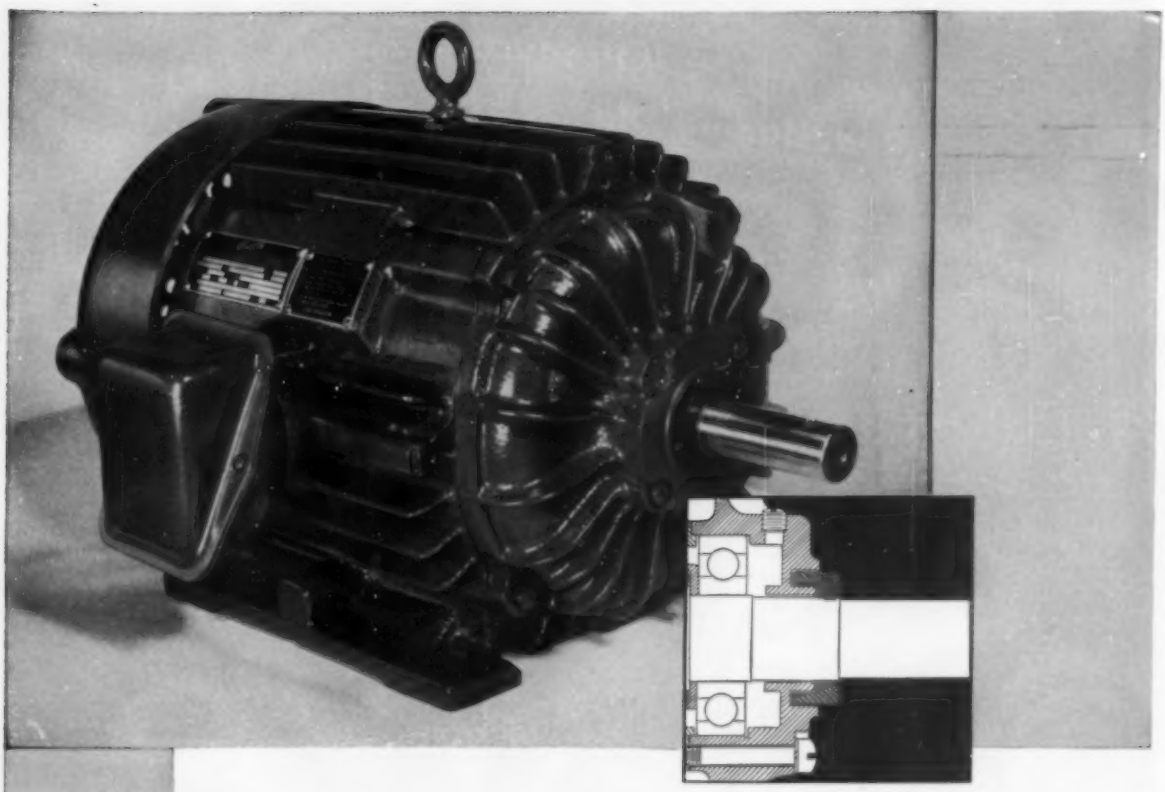

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Century TOTALLY ENCLOSED FAN COOLED MOTORS

When motor maintenance goes down, production goes up. Century TEFC Motor *protects itself* from dust, grit, chemical fumes, moisture. Shaft openings at each end are labyrinth-sealed, and there is a precision clearance between metal seal and bearing bracket.

Outside, a hose or whisk broom quickly cleans it. External fan forces jets of cooling air across the frame. Inside, vital motor parts are completely sealed off from injurious atmosphere. Factory lubrication of bearings is adequate for several years' service under normal conditions; however, whenever required bearings may be relubricated through grease plugs.

For full facts on your specific application, call the Century District Office or Authorized Distributor nearest you.

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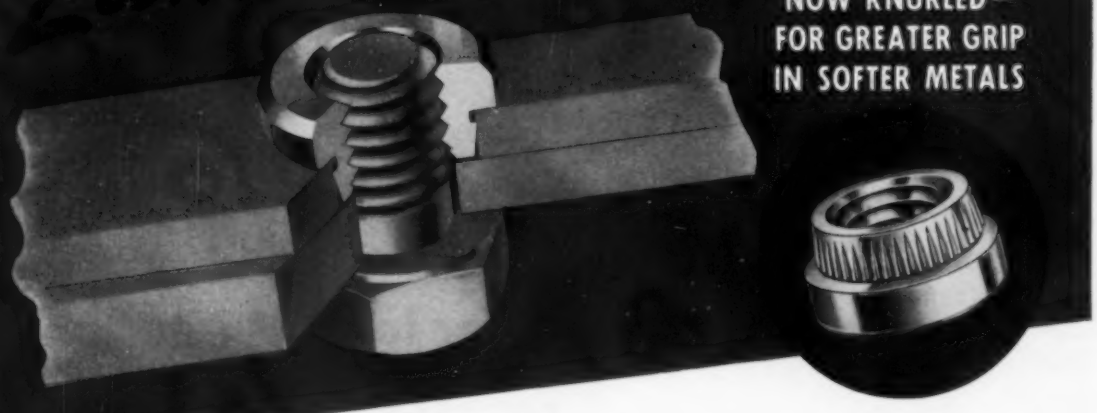
Planning New Products?
Redesigning Old?

It will pay to get the facts on

Lamson PLUG NUTS

NOW KNURLED—
FOR GREATER GRIP
IN SOFTER METALS

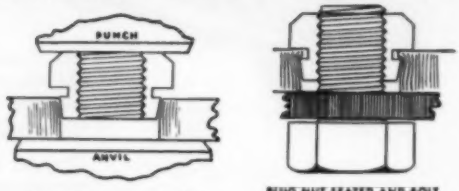


The Lamson Plug Nut has long been a favorite for assembling a wide variety of products. It is fast, efficient, inexpensive and can be hopper-fed on "automated" assembly lines.

Now Lamson & Sessions has improved this highly efficient, easy to use nut by knurling the portion that is inserted in the drilled or punched hole. This assures a tight, non-slip grip even in softer metals like copper, brass, magnesium and aluminum.

If you are still using or are planning to use awkward or expensive fastening methods, write for the whole story on Lamson Plug Nuts. You will discover a modern new way to save time and money on your assembly line!

Here's How Lamson Plug Nuts Work



SEATING PLUG NUT IN HOLE

PLUG NUT SEATED AND BOLT TIGHTENED DOWN

The nut is pressed into a punched or drilled hole of a predetermined diameter in ferrous or non-ferrous material. As the nut is inserted the material is compressed radially so that when the groove passes the top surface, the elasticity of the material will cause it to flow slightly into the groove, thus holding the nut in place.

Plug Nuts are made for use in any thickness of material down to .030" and in any tap size from No. 4 to ¾".

THE LAMSON & SESSIONS CO.

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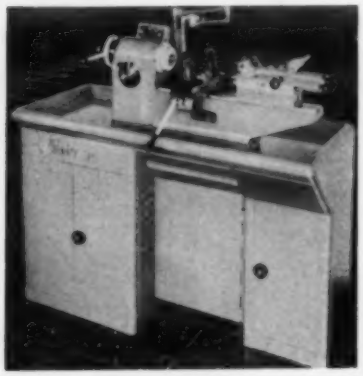
NEW PRODUCTS and equipment

chine automatically. The hydraulic traveling ram does overhead broaching in one pass. Transfer units move the parts into an elevating station for broaching.

A 6-ton model with a 54-in. stroke broaches ten bearing surfaces of the cast iron cylinder block in 29.5 seconds. Cutting speed: 30 fpm. *Write*: Colonial Broach & Machine Co., P. O. Box 37, Harper Station, Detroit 13, Mich. *Phone*: Jefferson 6-2550

Hand Turret Lathe

No. 94 is an electric clutch machine which has infinite spindle speeds from 140 to 3500 rpm. The high-to-low spindle ratio is 5:1.



The bench machine has a rigid self-centering bed. The double action cross slide has a variable speed system which gives maximum control for holding size, yet approaches the cut with speed. *Write*: Wade Tool Co., Waltham, Mass. *Phone*: Twinbrook 4-1050

Solvent Acid

Stripper S-A safely removes epons and other tough finishes from all metals except magnesium. It also removes paint, light rust and smut.

The material is used at room temperature and full strength. Parts are immersed for 1 to 10 minutes, then rinsed with cold or hot water.

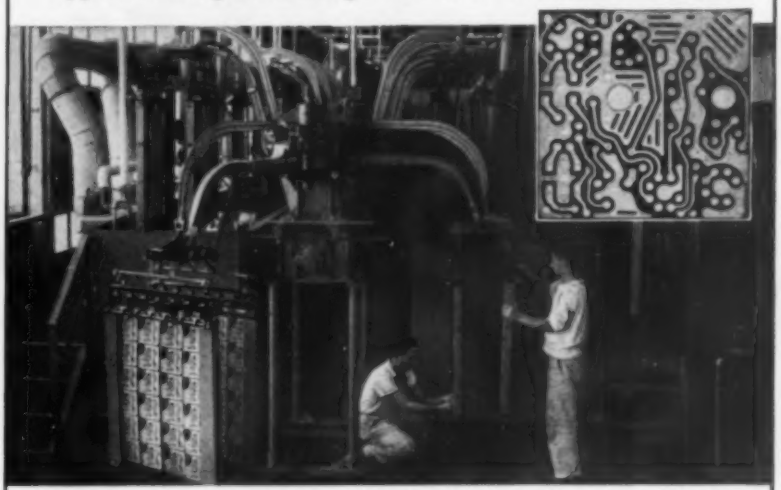
There is no fire hazard because the material has no flash point. *Write*: Oakite Products Inc., 134E Rector St., New York 6, N. Y. *Phone*: Whitehall 3-0940

A. B. HOEFER, *Vice-President*, FREDERIC B. STEVENS, INC.

STEVENS MACHINE SPEEDS PRODUCTION OF PLATED CIRCUITS

POSSIBLY ONE OF THE BIGGEST TECHNOLOGICAL ADVANCES in methods and materials for the assembly of electronic equipment is proving to be electrically conductive lines of copper, plated to uniform thicknesses on a plastic circuit board. Stevens is proud to be playing a part in this advancement.

ONE LARGE MANUFACTURER IS OBTAINING 2,880 PLATED CIRCUITS an hour with a Stevens Automatic Rack Type Processing and Plating Machine. The machine carries two



Stevens Automatic Processing and Plating Machine used for copper plating circuits at General Electric Company, Auburn, New York.

racks per arm, with each rack holding twenty-four circuits in position for plating. The results, beside the high production, are uniformity and "sure-fire" conductivity.

ANOTHER ADVANTAGE OF THE PLATED CIRCUITS is the "plated through" holes or eyelets which form a mechanical bond to the circuits on both sides of the base and also eliminate connective wiring of the two circuits.

Our engineers are constantly working toward the development of new ideas in plating and metal finishing. Why not let us help you in such problems as plating, anodizing, pickling, cleaning, electro-cleaning, phosphating, stripping, lubriting and other types of immersion processing. Write Frederic B. Stevens, Inc., 1804 Eighteenth Street, Detroit 16, Michigan.

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DETROIT 16, MICHIGAN

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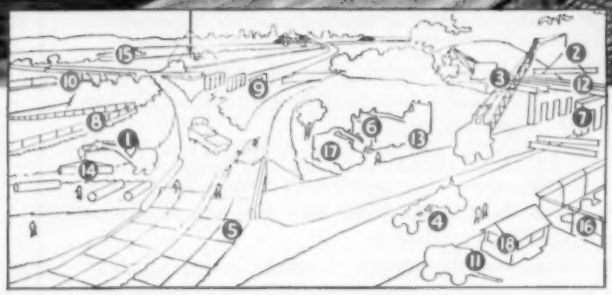

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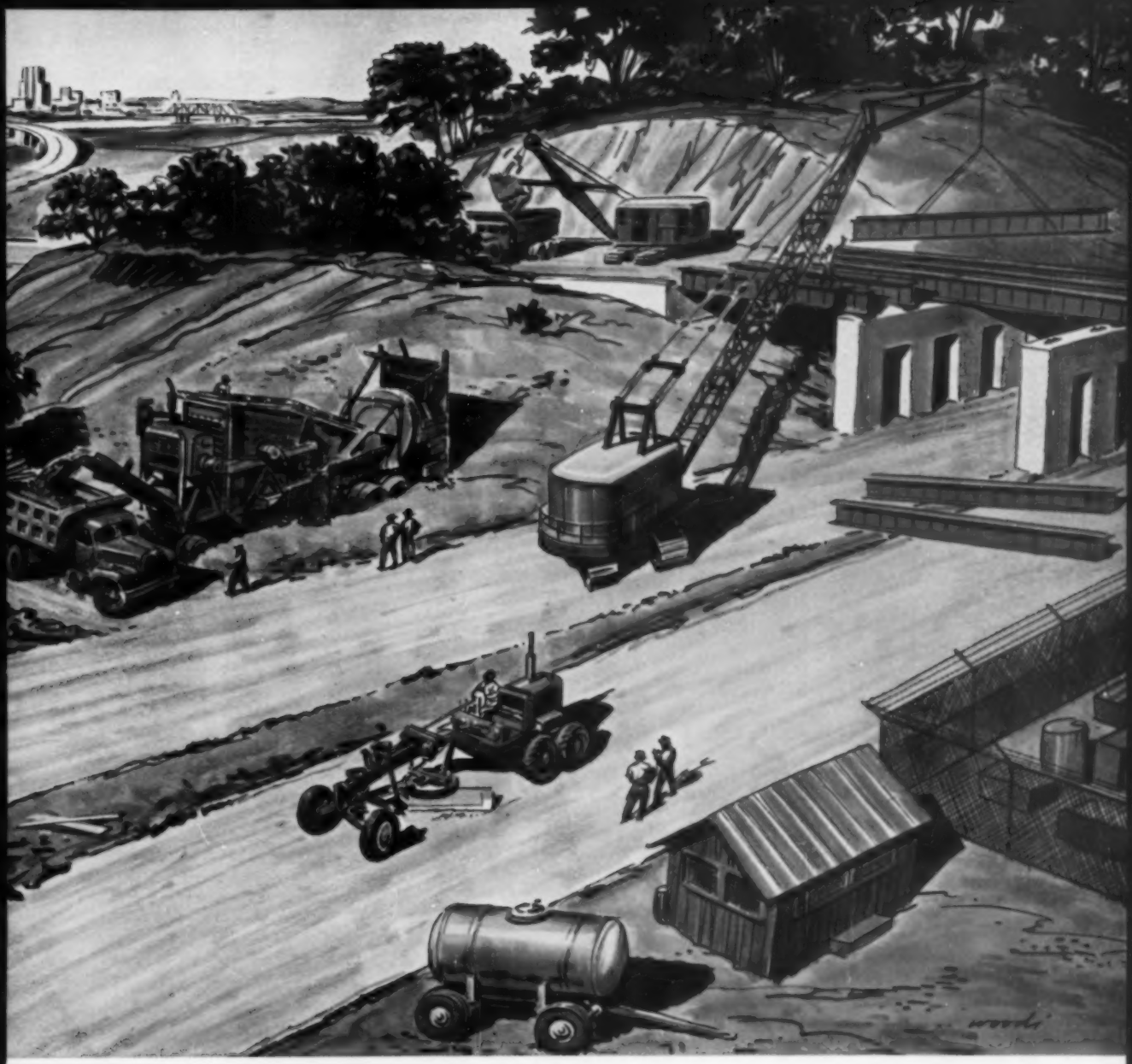
2. Wickwire Wire Rope Slings
3. Wickwire Boom Pendants
4. CF&I Cutting Edges
5. Clinton Welded Wire Fabric
6. CF&I Industrial Screens
7. CF&I Reinforcing Bars (in concrete)
8. CF&I Woven Wire Fence & Fence Posts
9. Cal-Tie Wire
10. CF&I Rails, Spikes, Track Bolts and Tie Plates
11. Claymont Heads
12. Claymont Welded Steel Plate Sections
13. Claymont Fabricated Steel Parts
14. Claymont Large Diameter Pipe
15. Claymont Alloy Steel Plates
16. Realock Chain Link Fence
17. Wickwire Springs
18. Gold Strand Insect Wire Screening



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Superhighways don't just happen. They are the result of careful planning by skilled engineers and builders . . . as well as the ability of manufacturers to have equipment and materials on the job site whenever and wherever they are needed. Today, America's accelerated roadbuilding program is making the task of these engineers, builders and manufacturers more challenging than ever before.

As a leading manufacturer of steel products for highways and other types of construction, CF&I pledges its wholehearted cooperation during the years ahead.

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NEW literature

Write directly to the company for a copy

Positioners

Bulletin UB57, 16 pages, describes five models of universal balance positioners with capacities of 25 to 2000 lb. Aronson Machine Co., Arcade, N. Y.

Spring Washers

Preassembled stacks of spring washers held together by pins or rivets are described in this 6-page bulletin. Associated Spring Corp., Bristol, Conn.

Subland Tools

This 6-page bulletin describes multipurpose and subland cutting tools. Detroit Reamer & Tool Co., 780 W. Maple Rd., P.O. Box 174, Birmingham, Mich.

Resistance Welding

Three-phase machines and their uses are discussed in bulletin 10-813-A, 12 pages. Bulletin 8-413, 10 pages, describes 32 multispot and projection welding machines. Taylor-Winfield Corp., Warren, O.

Hydraulic Presses

Bulletin 155, 16 pages, includes data on hydraulic oil and a lubrication guide for press users. Lake Erie Machinery Corp., 882 Woodward Ave., Buffalo 17, N. Y.

Precision Switches

This 4-page bulletin describes switches for electronic control requirements. Micro Switch Division, Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Induction Heating

This 12-page bulletin presents applications and new fixture developments for high frequency heating. Lepel High Frequency Laboratories Inc., Woodside, N. Y.

Ball Bearings

Advantages of a technique of fracturing the outer ring of a bearing to fill the unit with balls is described in bulletin 57, 28 pages. Split Ballbearing Corp., Lebanon, N. H.

Lighting

Solutions to 25 common industrial lighting problems are presented in this 52-page book. Large Lamp Department, General Electric Co., Nela Park, Cleveland 12, O.

Welded Fabrication

This 16-page bulletin presents the advantages of welded fabrications. Acme Welding Division, United Tool & Die Co., 1031 New Britain Ave., West Hartford 10, Conn.

Thread Rolling

A cold forming thread rolling machine is described in bulletin E-60, 16 pages. Landis Machine Co., Waynesboro, Pa.

Quality Control

Equipment for supervision, inspection and production operations is covered in bulletin QC-1056, 4 pages. Visi-trol Engineering Co., 9345 Hubbell, Detroit 28, Mich.

Gear Honing

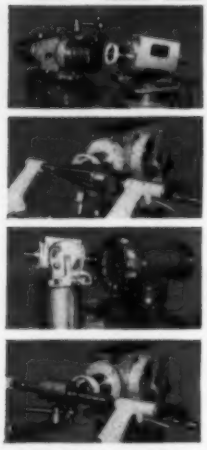
This 4-page bulletin, H-57-2, describes the advantages of machines used to hone spur and helical gears. National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich.

Guide for Closing Boxes

Advantages and disadvantages of the various methods of closing fiberboard boxes are covered in this 18-page bulletin. Acme Steel Products Division, Acme Steel Co., 135th & Perry Ave., Chicago 27, Ill.

Specify this

POPE SUPER PRECISION, 1 HP, 3600 RPM MOTORIZED TOOL AND CUTTER GRINDER CLEARANCE ANGLE SWIVELLING HEAD WITH ANGULAR ADJUSTMENT IN A VERTICAL PLANE



and get these seven savings:

1. Strong, long lasting tool cutting edges because cup wheel cutter grinding can be used for practically all clearance angles.
2. Tooth rest stays on the center line of the cutter for practically all grinding on centers or in the work head.
3. A single set-up grinds most cutters and reamers all over, using the swivelling table and Pope tilting head.
4. No more mistakes on clearance angles. They read directly in degrees from the scale provided on the head.
5. No more trouble or time wasted getting the right clearance angle on the tough ones such as slab mills, **taper reamers,** angular cutters and form tools.
6. No more heat checking of cutters. One safe speed — 3600 RPM — for all wheels generally used on cutter grinders.
7. Quick, easy adjustment saves you time and money every time you grind a tool.

Ask us to send you complete specifications including price and delivery.

No. 118

POPE ENGINEERS AND BUILDS STANDARD AND SPECIAL PRECISION ANTI-FRICTION BEARING SPINDLES FOR EVERY PURPOSE

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You may have parts right now that our engineers could value analyze for you. Send us the prints. A Progressive quote is a sure indicator that you are buying right!

Machine screws and special fasteners are our business . . .
Including square and hexagon machine screw nuts, Sems fasteners,
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STEEL

April 22, 1957

Market Outlook

STEEL INGOT production is the lowest it has been since the steelworkers' strike last summer. Even so, it averaged 90 per cent of capacity in the week ended Apr. 21. A week earlier, it was 90.5 per cent.

This rate yields 2,303,500 net tons of raw steel. On last year's capacity—smaller than this year's—this tonnage would represent a production rate of 93.5 per cent of capacity.

EXPECTATIONS—No one has expected 1957's output to average more than 90 per cent of capacity. This would yield 120 million net tons of steel for ingots and castings—a record. Some people think production won't go above the present record—117 million tons. This could be achieved with an annual average rate of 87.5 per cent of capacity.

The first quarter pace was well above these rates. It was 96 per cent of capacity. If the year averages 87.5 or 90 per cent, there will have to be some operations below 90 per cent of capacity.

FREEDOM—One reason there can be a slower weekly pace this year is the prospect that the industry can operate in every week of the year. Last year, six weeks were marred by strike. While there is to be no general strike of steelworkers this year, some scattered labor stoppages have been experienced this year, and others will crop out. Some of these are wildcat strikes in the mills, and some are among service groups, such as railroads.

SOMETHING NEW—One factor in the half-point decline to 90 per cent in the week ended Apr. 21 was Good Friday—now, for the first time, a paid holiday in the steel industry. Some mills did not observe it.

Among the slowest in operation are the wire mills (see page 123). They have been hit by: 1. A reduced demand from the automotive industry for manufacturers grades. 2. Slow buying of merchant wire products by farmers. 3. A substantial amount of wire imports.

COMPETITION—The increased supply of steel and easier demand are spurring steel companies to go farther afield for business. In doing this, they are absorbing part of the delivery charges to meet competition.

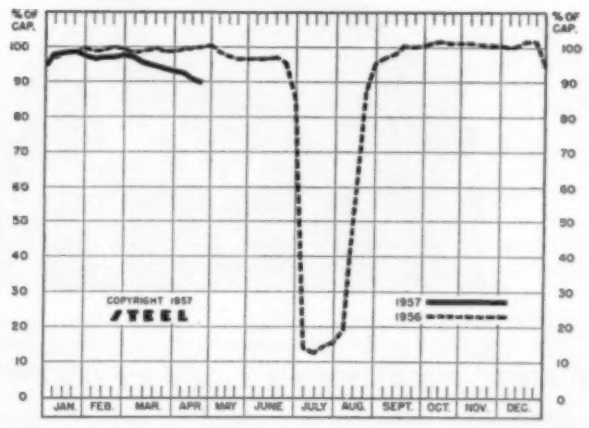
STEEL PRICES STEADY—The uptrend that started in steel prices last December has halted. For the last month, prices have been steady. Another upturn is due at midyear when the steelworkers get an automatic boost in pay.

SCRAP PRICES DROP—Headed downward in price is scrap—a raw material for steelmaking. STEEL's price composite on steelmaking scrap in the week ended Apr. 17 was $42.67 a gross ton, a $1.33 drop from that of the preceding week. The composite hasn't been this low since July, 1955.

For about three months, scrap has been declining pricewise from record heights. This decline is influenced by expectations of lowered operations in the steel industry, the arrival of good weather (it makes scrap collection and shipment easier) and a strong reliance on blast furnaces for the metallic charges for open-hearth steelmaking furnaces.

Some support is given to scrap prices by the export demand.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Apr. 21	Change	Same Week 1956	Same Week 1955
Pittsburgh	93.5	— 2*	104.5	98.5
Chicago	89.5	— 0.5	101	99
Mid-Atlantic	95	0	100	96
Youngstown	90	+ 1	97	98
Wheeling	85	— 8.5	98.5	94
Cleveland	88.5	+ 2*	95.5	97.5
Buffalo	92.5	— 5	105	104.5
Birmingham	95.5	0	93	90
New England	58	+ 3	86	84
Cincinnati	62.5	+ 1.5	95	91
St. Louis	99.5	— 1.5	95	106
Detroit	98.5	+ 3	97	91
Western	101	— 1	105	96
National Rate	90	— 0.5	100	95.5

INGOT PRODUCTION‡

	Week Ended Apr. 21	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	143.0†	143.8	148.9	153.5
NET TONS (In thousands)	2,297†	2,310	2,392	2,466

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—p. 39 Technical Outlook—p. 77

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Wire runs out of these Vaughn continuous wire drawing machines at J&L's Aliquippa, Pa., Works at 1000 ft a minute. The only problem: Selling it

Wire Off to Slow Start

Bad weather and sluggish auto sales have delayed the customary sales upsurge. But producers are confident that second quarter sales will be better than first quarter's

WIREMAKERS and auto producers have one important thing in common: Both are waiting for the spring upturn to materialize. The wire companies are confident it's just around the corner.

The second quarter normally is the best of the year for both manufacturers and merchant wire, the former largely because of the spring selling push in autos and the latter because of the spring activity on farms. So far, the auto market hasn't lived up to expectations, and bad weather has held off needed repairs in the country.

Remedy — Recent heavy rains and snow in the Midwest give promise of some improvement in last year's drouth areas. But as one wire sales manager puts it: "It takes about three years to build up the water table after a dry spell like that one. So we don't expect any great swelling of orders this year. It's just a start for 1958 and 1959." Coupled with rising farm incomes, the total effect could be a noticeable increase in business this quarter.

The saw-tooth character of sales charts so far this year leaves many industry officials puzzled. "Since making our first 1957 estimates last September, we have revised our thinking downward several times," says one sales executive. "January got off to a terribly slow start. In the middle of February, we had an influx of orders that sent our daily average soaring. But it flubbed out in March. The first part of April was even worse. About a week ago, some good orders raised the April average to 70 per cent that of March. If it continues, April will end up even with March, but that's not particularly good. If the present condition were to continue throughout the year, 1957 would fall about 30 per cent below 1956. However, our projection is for a decrease of only 10 or 12 per cent."

Optimistic — Pittsburgh and Cleveland producers, who are tied closely to the automotive market, feel that the slump is just about at its end. They think inventories are near rock bottom. While they don't look for heavy orders to rebuild those inventories, they feel that auto makers must come into the market for sufficient quantities of wire just to keep operating. In the fall, when new models come out, they expect considerably more interest in buying from Detroit.

Some areas, particularly Chica-

go and the Southeast, are plagued by imports of low price European and Japanese wire products. The vice president of one large southern wire company says his business is off 40 per cent in the first quarter from last year's period, all of it because of imports. "Demand is good down here," he says. "But foreign producers are underselling us by $25 a ton. Our salesmen are using every trick in the books—selling quality, buy American, preserving a domestic source in case of war. They're doing everything but giving away bubble gum and trading stamps."

A Chicago producer believes the industry is operating at about 60 to 70 per cent of capacity. Right now there is a pickup in woven fencing and barbed wire, but he attributes it to lower imports rather than to increased demand.

Hedging—Almost all wiremakers are sure that there will be some extra buying in late second quarter as a hedge against anticipated price increases at midyear. "We just hope it isn't borrowing business from third and fourth quarters," comments another sales manager.

Distributors have been slow to stock up on wire products this year because of a new pricing system put into effect by producers in 1956. Under it, if they buy large enough quantities, the cost is less. The mills add extras for reduced quantities and mixed orders. This requires distributors to carry larger stocks. But with the possibility of price increases in July, they are expected to increase their orders soon.

Warehouse . . .

Warehouse Prices, Page 139

The downtrend in orders for most flat-rolled products has run its course, say many leading distributors. The only heavy inquiry for products is reported in thick plate and wide flange beams. Pressure for light plate is easing as supply improves.

No substantial increase in demand due to seasonal factors is noted. Fasteners, wire and galvanized sheet (used in farm and house construction) continue in the doldrums.

Wire . . .

Wire Prices, Pages 134 & 135

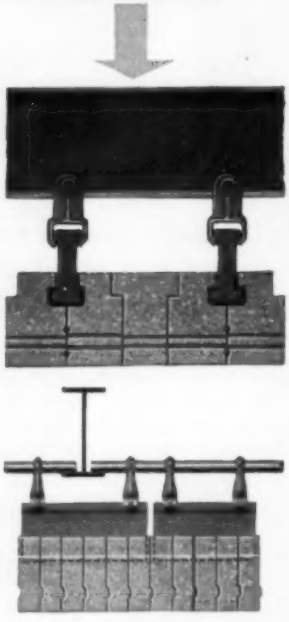
Wiremakers report rising requirements from construction companies and road builders. Manufacturers wire sales are gaining slowly, and the outlook for the second quarter in this area of the market is somewhat brighter. Auto builders' demands continue to be sluggish.

In merchant wire products, demand for barbed wire and fence wire has not responded to usual seasonal influences. There is some increase in requirements for farm and home improvements, but the gain in sales is not up to the volume of recent years.

Webster & Webster Inc., Meriden, Conn., is low bidder at $526,295 on guide railing, barrier and fencing for the Connecticut turnpike.

Many other users are following the procurement trend established by the auto industry. They order late each month for prompt shipment. Numerous carbon grades

This tile is called a dog bone!



It's a husky supporting tile—used instead of an expensive alloy casting in a double suspended arch designed by B-L for high temperature aluminum, steel and glass furnaces. It can stand extremely high temperatures—can be used with or without insulation.

The dog bone supports the arch tile. Bottom lugs are sloped so that the weight of the arch tile will draw the two together. Filler tile space out the arch.

Naturally the completed arch will possess all of the inherent characteristics of Bigelow-Liptak suspended construction. Burned out or damaged tile can be removed without disturbing large areas. Expansion is confined to individual tile—will not accumulate over the entire width of the arch. It all adds up to more production—less down time through keeping heat from raising the roof.

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can be obtained from mill stocks, or on two to three weeks' delivery. Consumers' inventories are lower, but this does not stimulate forward buying. Most mills are still booking for May shipment, including heading and spring grades. Demand for upholstery coils is spotty.

Plates . . .

Plate Prices, Page 132

Heavy and wide plate capacity is sold out through the second quarter in the East, and allocations are generally below what fabricating shops using stock in that category would like. Light and narrow strip mill plates have caught up with demand, and there are reported openings in some producers' June schedules.

Owing to improvement in light plate supplies, plate fabricators, notably tank shops, car builders and structural shops, are in better position to meet their commitments.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 133 & 134

Republic Steel Corp.'s expansion program at Gadsden, Ala., is nearing completion. A new continuous hot strip mill will go into operation late next month. A new tandem cold strip mill already is completed and only awaits coils from the hot strip mill.

Also ready are auxiliary equipment, including a continuous pickler, single stack annealing furnaces and a continuous galvanizing line for sheets and strip. Hand mill equipment has been torn out.

In early June, the first of two 175-ton electric furnaces will be producing carbon steel. The second furnace will be ready in September.

Although signs of a spring pickup in sheet demand on automotive and appliance account continue lacking, second quarter bookings so far assure maintenance of mill rolling schedules close to present levels over the next few weeks. Production of light-gage plates is taking up the slack for some mills.

Volume for May will not top that for April by much, if any, though auto sheet tonnage is reported slightly heavier. Hot-rolled sheets are in considerably better demand than cold rolled, particularly wider sizes. Galvanized sheets have not responded to usual seasonal developments.

Flat-rolled order backlogs are thin, and mill carryovers are light.

Cold-finished sellers at Pittsburgh estimate that auto makers are operating with sheet supplies running as low as 20 days.

Some price-hedge buying is expected to develop in late May and early June.

Steel Bars . . .

Bar Prices Page 133

Carbon and alloy bar consumers are slow to anticipate midyear price increases. Automotive buying continues slow. Demand for hot bars is described as fair. But cold-drawn bar volume is off noticeably, particularly on automotive account.

In the East, cold-finishing operations are no better than 75 to 80 per cent of capacity with most

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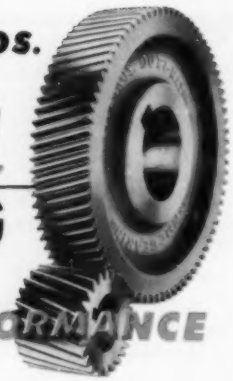
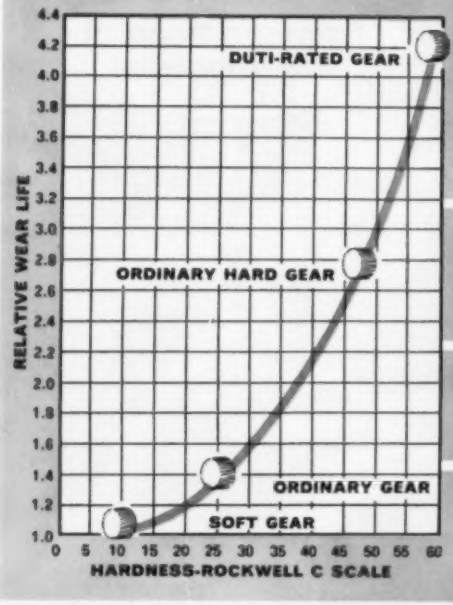


GEAR PERFORMANCE COMPARISON CHART



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ORDINARY GEAR—
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converters. These producers are holding back hot bar orders.

A flurry of last-minute orders for hot bars at Pittsburgh has brightened the May production outlook at that point. Generally, order backlogs are thin, but producers are filling orders on short lead time.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 132

Reinforcing steel is in easier supply than it was a year ago. Tightening up in the market is likely though when highway construction programs get into full swing.

In general, prospects are considered promising for active demand at most centers throughout the country over the next several months.

Pig Iron . . .

Pig Iron Prices, Page 139

Pig iron shipments in April and May are not likely to hit predicted levels. The chief cause: Inventory reductions by automotive foundries. Operations of gray iron foundries have slackened, too.

Suppliers fear that inventories are being so severely cut that any bulge in melting operations will bring a deluge of shipping orders.

Declining activity at open-hearth furnaces does not augur well for pig iron production. Mills shutting down open hearths for lack of orders will soon start taking off blast furnaces because merchant demand for iron is not heavy enough to absorb all output.

Iron Ore . . .

Iron Ore Prices, Page 140

With the 1957 lake navigation season under way, the Lake Superior Iron Ore Association reports shipments in the week ended Apr. 15 were 531,538 gross tons. Of this total, 169,519 tons came from Escanaba, Mich., 145,058 from Duluth, 171,733 from Two Harbors and 45,228 tons from Silver Bay. In the corresponding week of the 1956 season, shipments totaled 1,165,751 tons.

The first cargo of iron ore of the 1957 navigation season from the head of the lakes was received at the Conneaut, O., docks Feb. 15.

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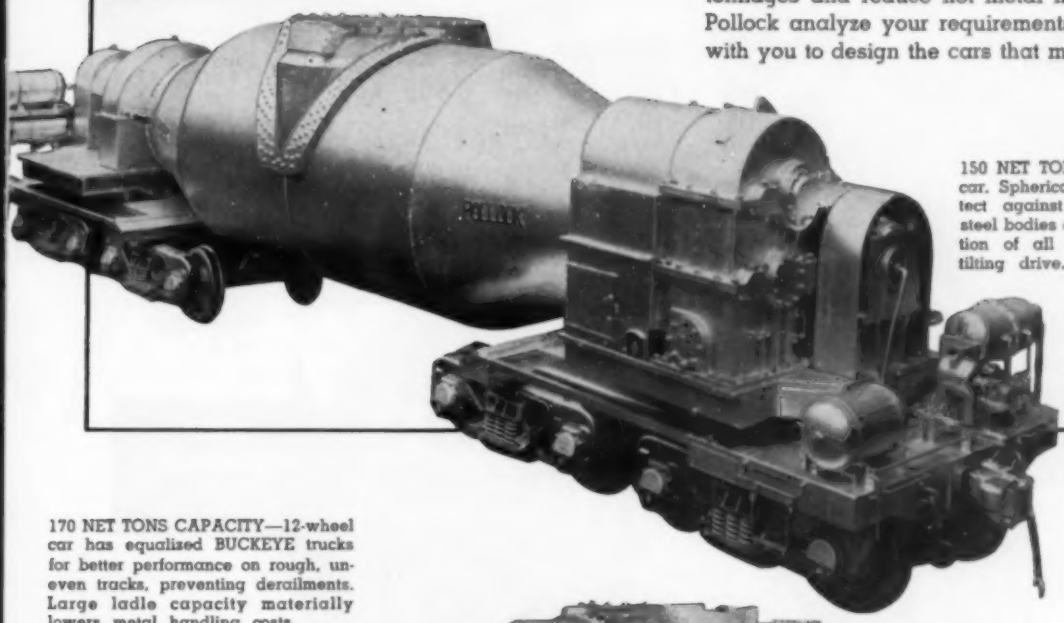
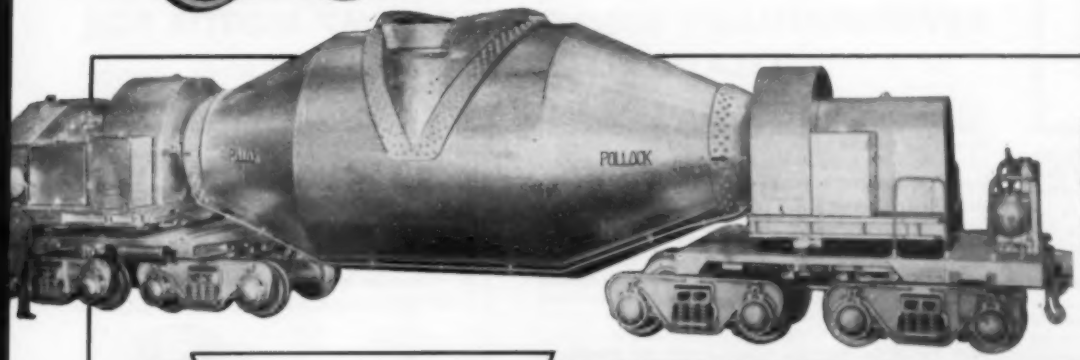
These are America's newest, BIG, hot metal cars. Pollock designed and built this type car to carry large tonnages and reduce hot metal handling costs. Have Pollock analyze your requirements. Pollock will work with you to design the cars that meet your needs best.



150 NET TONS CAPACITY—16-wheel car. Spherical trunnion bearings protect against misalignment. Welded steel bodies and ladles. Pump lubrication of all gears and bearings in tilting drive.

170 NET TONS CAPACITY—12-wheel car has equalized BUCKEYE trucks for better performance on rough, uneven tracks, preventing derailments. Large ladle capacity materially lowers metal handling costs.



200 NET TONS CAPACITY—America's largest. Dumping mechanism is completely covered. Car designed to meet specific plant conditions. Air brakes if desired.

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Saves on Production Costs
LESS WEIGHT
Saves on Metal

CUTAWAY of the radically new submersible explosion-proof pump motor made by LELAND ELECTRIC COMPANY which can be installed right in the gasoline storage tank. In this pump motor the fluid passes between the stator core and the extruded shell while in the conventional submersible pump motor a double shell is used. Stator shell of the LELAND MOTOR is 13 9/16" long and 3 1/2" O.D. and is made from a hollow Revere Aluminum Extrusion.

REVERE HOLLOW ALUMINUM EXTRUSION USED IN REVOLUTIONARY SUBMERSIBLE PUMP MOTOR FOR LELAND ELECTRIC COMPANY

The original design of this stator shell called for a casting but when the design engineers considered the factors that would be encountered, and the symmetry of shape, it became apparent that an aluminum extrusion might have many advantages over a casting.

At this stage Revere T.A. (Technical Advisory) Service, which in the past had proved helpful, was called in for collaboration and the advantages of extrusions vs. castings were discussed. By using extrusions there would be no problem of porosity which is often present in castings. Substantial savings in weight would be made and the only machining would be to the ribs on the inside of the tube. No machining of the outside of the tube would be required, which would be necessary should a casting be used, while the smoother surface on the inside would improve flow characteristics—an important factor in this particular pump motor as the fluid being pumped passes between the stator core and the extruded shell. With the smooth surface of an extrusion, less horsepower would be used to pump a given volume of fluid. The result was the Revere Aluminum Extrusion you see above.

This is still another example of Revere supplying the right metal in the right form to do the best job with the greatest economy . . . be it aluminum, copper or any one of their alloys. Why not consult Revere when you design?

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The freighter *Callaway* of the Pittsburgh Steamship Division's fleet (U.S. Steel Corp.) was the first vessel loaded with ore to enter Lake Erie. Severe ice conditions in the upper lakes are hampering many vessels. Expectations are ore will flow in heavy volume around the end of the month.

March Steel Output Dips

Daily production of steel in the first quarter of this year was greater than it was in the comparable period of 1956, but the 31,586,968-ton total was slightly lower because of the day-longer quarter a year ago, reports the American Iron & Steel Institute. There were 90 days in the quarter this year.

The decline this year was about 285,000 tons, less than one day's production. The daily average in the first quarter this year was 350,966 tons, compared with 350,242 in the first three months last year, when output was 31,872,014 tons.

March production totaled 10,591,000 net tons, down from the 10,924,788 reported for March, 1956.

The steelmaking furnaces operated at 96 per cent in the first quarter (based on rated capacity as of Jan. 1 of 133,459,150 net tons). The March average was 93.4 per cent, against 100.2 last year when capacity was rated at 128,363,090 net tons.

The index of production (1947-49 equals 100) was 152.9 during the first quarter. This compares with 152.6 in the like quarter last year. The index for March was 148.9, against 155.4 in February and 153.6 in March, 1956.

Tubular Goods . . .

Tubular Good, Prices, Page 136

A major oil country goods producer at Pittsburgh is opening its books for third quarter orders, having sold out its anticipated second quarter production. Early reports on sales prospects for next quarter confirm the healthy state of the market.

Seamless tubular specialties continue in heavy demand, and the tube mills will have little excess tonnage this quarter. Buttweld pipe sales continue to be disappointing.

Structural Shapes . . .

Structural Shape Prices, Page 132

The seasonal upturn in building is not as strong as had been expected in structural circles. New jobs are not developing in volume, and structural mills and fabricating shops are beginning to make inroads on their order backlogs.

Fabricators' deliveries are not substantially improved in the East. But shipments are not becoming more extended. In the case of the larger bridge shops, this has been due to a lag in highway projects, some of which are being revised to tie in with the federal program.

Bridge tonnage for New York and Pennsylvania is up slightly, including one 5625-ton contract.

Steel Ingot Production—March, 1957

Period	—OPEN HEARTH— Net tons	Per cent of capacity	—BESSEMER— Net tons	Per cent of capacity	—ELECTRIC— Net tons	Per cent of capacity	—TOTAL— Net tons	Per cent of capacity
1957								
January ..	9,829,691	99.0	294,839	77.1	884,232	86.5	11,008,762	97.1
*February .	8,898,671	99.2	277,682	80.4	819,853	87.8	9,987,206	97.6
†March ...	9,443,000	95.1	275,000	71.9	873,000	85.4	10,591,000	93.4
†1st Qtr...	28,171,362	97.7	847,521	76.3	2,568,085	86.5	31,586,968	96.0
1956								
January ..	9,676,151	101.4	323,235	79.5	828,845	86.7	10,828,231	99.3
February .	9,043,084	101.3	296,543	78.0	779,358	87.1	10,118,995	99.2
March	9,795,283	102.7	310,060	74.3	819,465	85.7	10,924,788	100.2
1st Qtr. ..	28,514,478	101.8	929,838	77.9	2,427,698	86.5	31,872,014	99.6
April	9,437,945	102.2	306,358	77.9	779,452	84.2	10,523,785	99.7
May	9,370,167	98.2	297,990	73.3	822,219	86.0	10,490,376	98.2
June	8,665,044	93.9	282,846	71.9	773,546	83.6	9,721,436	92.1
2nd Qtr. ..	27,473,156	98.1	887,224	74.3	2,375,217	84.6	30,735,597	96.0
1st 6 Mo..	55,987,634	100.0	1,817,062	76.1	4,802,915	85.6	62,607,611	97.8
July	1,330,151	13.9	.....	....	292,012	30.5	1,622,163	14.9
August ...	7,213,274	75.6	189,564	46.6	719,759	75.3	8,122,597	74.5
September..	9,342,796	101.2	286,978	72.9	792,885	85.7	10,422,659	98.8
3rd Qtr. ..	17,886,221	63.2	476,542	39.5	1,804,656	63.6	20,167,419	62.3
9 Mo.	73,873,416	87.6	2,293,604	63.8	6,607,571	78.2	82,774,591	85.9
October ...	9,841,002	103.2	330,101	81.2	877,410	91.8	11,048,513	101.3
November .	9,430,248	102.2	295,827	75.2	829,425	89.6	10,555,500	100.0
December .	9,695,919	101.6	308,465	75.9	833,161	87.1	10,837,545	99.4
4th Qtr. .	28,967,169	102.3	934,393	77.4	2,539,996	89.5	32,441,558	100.3
2d 6 Mo..	46,853,390	82.8	1,410,935	58.5	4,344,652	76.5	52,606,977	81.3
Total 1956	102,840,585	91.6	3,227,997	67.4	9,147,567	81.2	115,216,149	89.8

Note—The percentages of capacity operated are calculated on annual capacities as of Jan. 1, 1956, as follows: Open hearth 112,317,040 net tons, bessemer 4,787,000 net tons, electric 11,259,050 net tons, total 128,363,090 net tons.

Note—The percentages of capacity operated are calculated on annual capacities as of Jan. 1, 1957, as follows: Open hearth 116,912,410 net tons, bessemer 4,505,000 net tons, electric 12,041,740 net tons, total 133,459,150 net tons.

*Revised. †Preliminary figures subject to revision.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

8000 tons, publishing plant, *New York Times*, 63rd and West End avenue, New York, to Bethlehem Steel Co., Bethlehem, Pa.; Rheinstein Construction Co. Inc., New York, general contractor.

5625 tons, Summit bridge, Chesapeake-Delaware canal, New Castle county, Del.—Cecil county, Md., Corps of Engineers, Philadelphia, to the American Bridge Division, U.S. Steel Corp., Pittsburgh.

1355 tons, bridge superstructure, including girder spans, contract ST-2, crossing Calumet Sag channel, Illinois State Toll Highway Commission, to the American Bridge Division, U.S. Steel Corp., Pittsburgh.

225 tons, various items, Eielson Air Base, Alaska, Nike installation, to United Iron Works, Seattle; Peter Kiewit Sons Co., Seattle, general contractor.

170 tons, tank roof, Eielson Air Base, Alaska, to the Truscon Steel Co., Seattle.

150 tons, crane facility building, Hanford Works, to the Pacific Car & Foundry Co., Seattle.

100 tons plus, low power reactor, Idaho Falls, Idaho, station, to the Chicago Bridge & Iron Co., Salt Lake City, low at $167,400.

STRUCTURAL STEEL PENDING

1600 tons, four aircraft shelters, in Pacific Northwest; bids to the U.S. Engineer, Walla Walla, Wash., May 2.

1085 tons, one plate girder and four I-beam bridges, Westmoreland county, Pa.; bids May 3, Harrisburg, Pa.; also 315 tons, reinforcing bars.

635 tons, tunnel supports, Worcester diversion project, Blackstone river basin, Auburn-Millbury, Conn.; bids about May 14, Corps of Engineers, Boston.

300 tons, composite rolled beam bridge, Torrington, Conn.; Oneglia & Gervasini Inc., Torrington, low on general contract; also 75 tons of reinforcing bars.

190 tons, plate girder bridge over railroad, Upper Moreland-Horsham-Warrington, Pa.; bids May 3, Harrisburg, Pa., also 65 tons, reinforcing bars.

160 tons, flood control project, Blackstone river, Woonsocket-North Smithfield, R. I.; bids about May 28, Corps of Engineers, Boston.

145 tons, two bridges, Winchester, Conn.; White Oak Excavators Inc., Plainville, Conn., low on general contract; also 155 tons of reinforcing steel.

130 tons, two-span welded plate girder bridge, Washington, Conn.; Della Bitta-Bassola Inc., New Haven, Conn., low on general contract; also 40 tons of reinforcing bars.

100 tons, state highway bridge, Fall River expressway, Randolph, Mass.; Old Colony Construction Co., Quincy, Mass., is low on general contract.

REINFORCING BARS . . .

REINFORCING BARS PLACED

740 tons, Eielson Air Base, Alaska, Nike project, to the Bethlehem Pacific Coast Steel Corp., Seattle; Peter Kiewit Sons Co., Seattle, general contractor.

650 tons, Elmendorf Air Field, Alaska, Nike project, to the Northwest Steel Rolling Mills Inc., Seattle; Patti-MacDonald Co., Seattle, general contractor.

600 tons, office building, Howard Realty Co., Providence, R. I., to the Plantations Steel Co., Providence; George A. Fuller Co., Boston, general contractor.

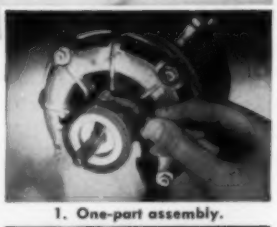
200 tons, Washington state, Whatcom county, overcrossing, to the Bethlehem Pacific Coast Steel Corp., Seattle; C. B. Croy, Bellingham, Wash., general contractor.

4-POINT HOLDING POWER

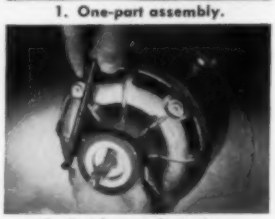
PRESTOLE'S *Superior Design* MOTOR MOUNTING BRACKET!

Among the numerous advantages of this new Prestole product are its greater holding power, simplicity of design, ease and speed of assembly, and low initial cost. *It eliminates three parts* formerly used in mounting motors. Where the holding power formerly depended on the variable tightness of a screw, Prestole's Motor Mounting Bracket, with exclusive 4-point grip on the motor mounting ring, maintains the same, constant holding power indefinitely.

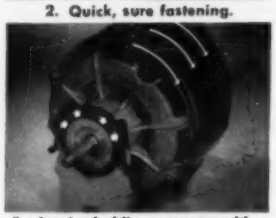
Under long and continuous engineering torque tests, the Prestole Motor Mounting Bracket withstood thousands of motor starts with no indication of slippage or loss of holding power. Prestole's high-speed production methods and modern facilities assure fast delivery of this new product to meet your production schedule. Consult your local Prestole representative or write direct to the factory for full engineering details.



1. One-part assembly.



2. Quick, sure fastening.



3. 4-point holding power—withstands severe starting torque.

PRESTOLE Corporation
1320 MIAMI STREET • TOLEDO 5, OHIO
PRESTOLE OF CANADA • OAKVILLE, ONTARIO

SEND ENGINEERING APPLICATION DATA ON PRESTOLE MOTOR MOUNTING BRACKET

TO:
Name_____ City_____
Company_____ Zone_____
Street_____ State_____

120 tons, Fairchild Air Base, Spokane, Wash., to the Bethlehem Pacific Coast Steel Corp., Seattle; McInnes & Henry George, Spokane, Wash., general contractor.

REINFORCING BARS PENDING

2345 tons, state highway structures, Northern Illinois toll highway, contracts T-9A, T-9B and T-1C; bids May 2, Chicago.

913 tons, 5.009 miles of Tri-State route, northern Illinois toll highway contract T-IC, Thornton and Bremen townships, Cook county, Ill., for the Illinois State Toll Highway Commission, Chicago; bids May 2.

995 tons, 2.29 miles of Tri-State route, northern Illinois toll highway contract T-9A, including erection of precast concrete bridges, Maine township, Cook county, Ill., for the Illinois State Toll Highway Commission, Chicago; bids May 2.

437 tons, 2.10 miles of Tri-State route, northern Illinois toll highway contract T-9B, including erection of precast concrete bridges, Maine township, Cook county, Ill., for the Illinois State Toll Highway Commission, Chicago; bids May 2.

135 tons, Montana state highway bridge, Missoula, Mont.; bids to Helena, Mont., Apr. 25.

115 tons, Worcester diversion project, Blackstone river basin, Auburn-Millbury, Mass.; bids about May 14, Corps of Engineers, Boston.

PLATES . . .

PLATES PLACED

125 tons, elevated steel water tank, Albemarle, N.C., to the Chicago Bridge & Iron Co., Chicago, $172,500.

125 tons, water tank, Atomic Energy Commission, Arco, Idaho, to the Chicago Bridge & Iron Co., Chicago, $167,400.

100 tons, Nike installation at Eielson Air Base, Alaska, to the Puget Sound Fabricators Inc., Seattle; Peter Kiewit Sons Co., Seattle, general contractor.

120 tons, large diameter welded pipe, North American Iron & Steel Co., Brooklyn, N.Y., to the Bethlehem Steel Co., Bethlehem, Pa.

PLATES PENDING

1625 tons, penstocks and surge tank, Green Springs, Rouge river, Oreg., project; bids in May to the Bureau of Reclamation.

200 tons, 2-million-gal water tank, District No. 97; bids to L. A. Kilburn, secretary, 15450 Lake Hills boulevard, Bellevue, Wash., Apr. 25.

115 tons, three 50,000-gal fuel oil storage tanks, Topsham (Me.) Air Base; bids Apr. 15, Corps of Engineers, Boston.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Brazil, six 1200-hp diesels, narrowgage, to General Electric Co., Schenectady, N.Y.

Great Northern, 150 seventy-ton covered hoppers to the Pullman-Standard Car Mfg. Co., Chicago.

Wabash, 100 seventy-ton gondolas to the Bethlehem Steel Co., Bethlehem, Pa., and 50 seventy-ton covered hoppers to the Greenville Steel Car Co., Greenville, Pa.

Union Pacific, 100 seventy-ton covered hoppers to the General American Transportation Corp., Chicago.

Cotton Belt, 50 seventy-ton gondolas to the Bethlehem Steel Co., Bethlehem, Pa., and 100 seventy-ton covered hoppers to the Pullman-Standard Car Mfg. Co., Chicago.

Florida East Coast, 55 seventy-ton covered hoppers to the Pullman-Standard Car Mfg. Co., Chicago; 50 seventy-ton open-top hoppers, to the ACF Industries Inc., New York, and 150 seventy-ton gondolas, to the Magor Car Co., New York.

RAILROAD CARS PENDING

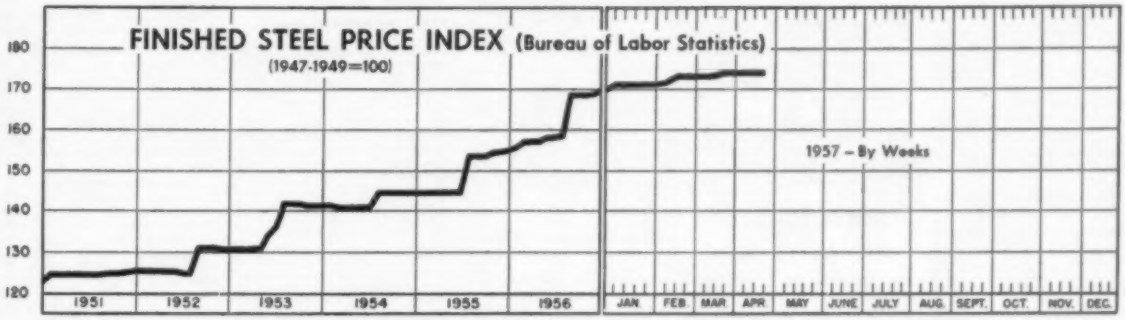
Baltimore & Ohio, 2000 seventy-ton, open-top, drop-bottom cars.

PIPE . . .

CAST IRON PIPE PLACED

700 tons, 4 to 20 in., for Seattle expansion, to the U.S. Pipe & Foundry Co., Seattle.

Price Indexes and Composites



Apr. 16, 1957	Week Ago	Month Ago	Mar. Avg	Year Ago
174.0	174.0	174.0	173.9	157.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Apr. 16

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.350
Rails, Light, 40 lb	6.817
Tie Plates	6.275
Axles, Railway	9.400
Wheels, Freight Car, 33 in. (per wheel)	57.50
Plates, Carbon	5.900
Structural shapes	5.667
Bars, Tool Steel, Carbon (lb)	0.489
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.595
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274
Bars, Tool Steel, H.R., Alloy, High Speed, W18 Cr 4, V 1 (lb)	1.769
Bars, H.R., Alloy	10.150
Bars, H.R. Stainless, 303 (lb)	0.508
Bars, H.R., Carbon	6.075
Bars, Reinforcing	5.788
Bars, C.F., Carbon	9.910
Bars, C.F., Alloy	13.450
Bars, C.F., Stainless, 302 (lb)	0.533
Sheets, H.R., Carbon	5.945
Sheets, C.R., Carbon	6.789
Sheets, Galvanized	8.220
Sheets, C.R., Stainless, 302 (lb)	0.660
Sheets, Electrical	11.225
Strip, C.R., Carbon	8.843
Strip, C.R., Stainless, 430 (lb)	0.475
Strip, H.R., Carbon	6.000
Pipe, Black, Buttweld (100 ft)	18.594
Pipe, Galv., Buttweld (100 ft)	23.034
Pipe, Line (100 ft)	190.108
Casing, Oil Well, Carbon (100 ft)	185.566
Casing, Oil Well, Alloy (100 ft)	288.980
Tubes, Boiler (100 ft)	46.737
Tubing, Mechanical, Carbon (100 ft)	23.713
Tubing, Mechanical, Stainless, 304 (100 ft)	197.663
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.433
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.133
Black Plate, Canmaking Quality (95 lb base box)	7.233
Wire, Drawn, Carbon	9.775
Wire, Drawn, Stainless, 430 (lb)	0.630
Bale Ties (bundle)	7.400
Nails, Wire, 8d Common	9.365
Wire, Barbed (80-rod spool	5.412
Woven Wire Fence (20-rod roll)	26.565

STEEL's FINISHED STEEL PRICE INDEX*

	Apr. 17 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	227.41	227.41	227.41	209.10	171.02
Index in cents per lb	6.161	6.161	6.161	5.665	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$139.71	$139.71	$139.51	$128.02	$106.32
No. 2 Fdry Pig Iron, GT	64.70	64.70	64.56	60.06	52.54
Basic Pig Iron, GT	64.23	64.23	64.11	59.61	52.16
Malleable Pig Iron, GT	65.77	65.77	65.63	61.06	53.27
Steelmaking Scrap, GT	42.67	44.00	48.83	55.00	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Apr. 17 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R.,deld.,Philadelphia	5.365	5.365	5.365	4.93	4.223
Bars, C.F., Pittsburgh	6.55*	6.55*	6.55*	6.25*	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.31	5.31	5.31	5.00	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.70	5.70	5.70	4.80	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsbugh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.25-6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.50
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.60	4.85-5.10
Nails, Wire, Pittsburgh	8.49	8.49	8.49	7.60	5.90-6.20
Tin plate (1.50 lb) box, Pitts.	$9.95	$9.95	$9.95	$9.45	$8.70

*Including 0.35c for special quality.

SEMIFINISHED STEEL	Apr. 17 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, 5/16-9/32" Pitts.	5.80	5.80	5.80	5.375	4.10-4.30

PIG IRON, Gross Ton	Apr. 17 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$65.50	$65.50	$65.50	$61.00	$53.00
Basic, Valley	64.50	64.50	64.50	60.00	52.00
Basic, deld., Phila.	68.38	68.38	68.38	63.76	56.81
No. 2 Fdry, NevilleIsland,Pa.	65.00	65.00	65.00	60.50	52.50
No. 2 Fdry, Chicago	65.00	65.00	65.00	60.50	52.50
No. 2 Fdry, deld., Phila.	68.88	68.88	68.88	64.26	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry(Birm.)deld.Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	65.00	65.00	65.00	60.50	52.50
Malleable, Chicago	65.00	65.00	65.00	60.50	52.50
Ferromanganese, Duquesne	255.00†	255.00†	255.00†	215.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)	Apr. 17 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
No. 1 Heavy Melt, Pittsburgh	$41.50	$42.50	$48.50	$54.50	$44.00
No. 1 Heavy Melt, E. Pa.	46.00	48.50	53.00	56.00	42.50
No. 1 Heavy Melt, Chicago	40.50	41.00	45.00	54.50	42.50
No. 1 Heavy Melt, Valley	41.50	39.50	46.50	60.50	44.00
No. 1 Heavy Melt, Cleve.	38.50	37.00	43.50	57.50	43.00
No. 1 Heavy Melt, Buffalo	41.50	41.50	48.50	55.50	43.00
Rails, Rerolling, Chicago	56.50	54.50	59.50	72.50	52.50
No. 1 Cast, Chicago	39.50	39.50	42.50	51.50	49.00

COKE, Net Ton	Apr. 17 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$14.125	$14.75
Beehive, Fdry, Connlsvl.	18.00	18.00	18.00	16.50	17.80

Steel Prices

Mill prices as reported to STEEL, Apr. 17, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 134; to footnotes, page 136.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$70.50

INGOTS, Alloy (NT)

Detroit R7 .....$74.00
Houston S5 .....74.00
Midland,Pa. C18 .....74.00
Munhall,Pa. U5 .....74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Bessemer,Pa. U5 ....$74.00
Bridgeport,Conn. N19 ..79.00
Buffalo R2 .....74.00
Clairton,Pa. U5 .....74.00
Ensley,Ala. T2 .....74.00
Fairfield,Ala. T2 .....74.00
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....74.00
Johnstown,Pa. B2 .....74.00
Lackawanna,N.Y. B2 ..74.00
LoneStar,Tex. L6 ....80.00
Munhall,Pa. U5 .....74.00
S.Chicago,Ill. R2, U5..74.00
S.Duquesne,Pa. U5 ...74.00
Sterling, Ill. N15 .....74.00
Youngstown R2 .....74.00

Carbon, Forging (NT)

Bessemer,Pa. U5 ....$91.50
Bridgeport,Conn. N19 ..96.50
Buffalo R2 .....91.50
Canton,O. R2 .....94.00
Clairton,Pa. U5 .....91.50
Conshohocken,Pa. A3 ..96.50
Ensley,Ala. T2 .....91.50
Fairfield,Ala. T2.....91.50
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....91.50
Geneva,Utah C11 .....91.50
Houston S5 .....96.50
Johnstown,Pa. B2 ....91.50
Lackawanna,N.Y. B2..91.50
LosAngeles B3 .....101.00
Midland,Pa. C18 .....91.50
Munhall,Pa. U5 .....91.50
Seattle B3 .....105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ....91.50
S.SanFrancisco B3 ...101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..$107.00
Bridgeport,Conn. N19.107.00
Buffalo R2 .....107.00
Canton,O. R2 .....107.00
Conshohocken,Pa. A3 .114.00
Detroit R7 .....107.00
Fontana,Calif. K1 ....128.00
Gary,Ind. U5 .....107.00
Houston S5 .....112.00
Ind.Harbor,Ind. Y1 ..107.00
Johnstown,Pa. B2 ....107.00
Lackawanna,N.Y. B2.107.00
LosAngeles B3 .....127.00
Massillon,O. R2 ....107.00
Midland,Pa. C18 .....107.00
Munhall,Pa. U5 .....107.00
S.Chicago R2,U5,W14 .107.00
S.Duquesne,Pa U5 ..107.00
Struthers,O. Y1 .....107.00
Warren,O. C17 .....107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 .....111.50
Canton,O. R2 .....114.00
Cleveland,O. R2 ....111.50
Gary,Ind. U5 .....111.50
S.Chicago,Ill. R2, W14.111.50
S.Duquesne,Pa. U5 ..111.50

SKELP

Aliquippa,Pa. J5 .....4.725
LoneStar,Tex. L6 ....5.025
Munhall,Pa. U5 .....4.625
Warren,O. R2 .....4.625
Youngstown R2, U5 ..4.625

WIRE RODS

AlabamaCity,Ala. R2 ..5.80
Aliquippa,Pa. J5 .....5.80
Alton,Ill. L1 .....6.00
Buffalo W12 .....5.80
Cleveland A7 .....5.80
Donora,Pa. A7 .....5.80
Fairfield,Ala T2 .....5.80
Houston S5 .....6.05
IndianaHarbor,Ind. Y1..5.80
Johnstown,Pa. B2 .....5.80
Joliet,Ill. A7 .....5.80
KansasCity,Mo. S5 ....6.05
Kokomo,Ind. C16 .....5.90
LosAngeles B3 .....6.60
Minnequa,Colo. C10 ....6.05
Monessen,Pa. P17 .....5.80
N.Tonawanda,N.Y. B11 .5.80
Pittsburg,Calif. C11 ....6.60
Portsmouth,O. P12 ....5.80
Roebling,N.J. R5 .....5.90
S.Chicago,Ill. R2 .....5.80
SparrowsPoint,Md. B2 ..5.90
Sterling,Ill.(1) N15 ...5.80
Sterling,Ill. N15 .....5.90
Struthers,O. Y1 .....5.80
Worcester,Mass. A7 ....6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 .....5.00
Atlanta A11 .....5.20
Aliquippa,Pa. J5 .....5.00
Bessemer,Ala. T2 .....5.00
Bethlehem,Pa. B2 .....5.05
Birmingham C15 .....5.00
Clairton,Pa. U5 .....5.00
Fairfield,Ala T2 .....5.00
Fontana,Calif. K1 ....5.75
Gary,Ind. U5 .....5.00
Geneva,Utah C11 .....5.00
Houston S5 .....5.10
Ind.Harbor,Ind. I-2 ....5.00
Johnstown,Pa. B2 .....5.05
Joliet,Ill. P22 .....5.00
KansasCity,Mo. S5 ....5.10
Lackawanna,N.Y. B2 ..5.05
LosAngeles B3 .....5.70
Minnequa,Colo. C10 ....5.30
Munhall,Pa. U5 .....5.00
Niles,Calif. P1 .....5.75
Phoenixville,Pa. P4 ...5.85
Portland,Oreg. O4 ....5.80
Seattle B3 .....5.75
S.Chicago,Ill. U5, W14.5.00
S.SanFrancisco B3 ....5.65
Sterling,Ill. N15 .....5.00
Torrance,Calif. C11 ....5.70
Weirton,W.Va. W6 ....5.00

Wide Flange

Bethlehem,Pa. B2 ....5.05
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....5.90
IndianaHarbor,Ind. I-2 .5.25
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
Phoenixville,Pa. P4 ....5.85
S.Chicago,Ill. U5 .....5.00

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.30
Munhall,Pa. U5 .....6.20
S.Chicago,Ill. U5 .....6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 .....7.35
Bessemer,Ala. T2 .....7.35
Bethlehem,Pa. B2 .....7.40
Clairton,Pa. U5 .....7.35
Fairfield,Ala. T2 .....7.35
Fontana,Calif. K1 .....8.10
Gary,Ind. U5 .....7.35
Geneva,Utah C11 .....7.35
Houston S5 .....7.45
Ind.Harbor,Ind. I-2, Y1.7.35
Johnstown,Pa. B2 .....7.40
KansasCity,Mo. S5 ....7.45
Lackawanna,N.Y. B2 ..7.40
LosAngeles B3 .....8.05
Munhall,Pa. U5 .....7.35
Seattle B3 .....8.10
S.Chicago,Ill. U5, W14..7.35
S.SanFrancisco B3 ....8.00
Struthers,O. Y1 .....7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....7.40
Lackawanna,N.Y. B2 ..7.40
Munhall,Pa. U5 .....7.35
S.Chicago,Ill. U5 .....7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.05
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
S.Chicago,Ill. U5 .....5.00

STEEL SHEET PILING

Lackawanna, N.Y. B2 ..5.90
Munhall,Pa. U5 .....5.90
S.Chicago, Ill. U5 .....5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.85
Aliquippa,Pa. J5 .....4.85
Ashland,Ky.(15) A10 ..4.85
Bessemer,Ala. T2 .....4.85
Clairton,Pa. U5 .....4.85
Claymont,Del. C22 ....5.70
Cleveland J5, R2 .....4.95
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ..4.95
Detroit M1 .....4.95
Ecorse,Mich. G5 .....4.95
Fairfield,Ala. T2 .....4.85
Fontana,Calif.(30) K1 ..5.60
Gary,Ind. U5 .....4.85
Geneva,Utah C11 .....4.85
GraniteCity,Ill. G4 ....5.05
Harrisburg,Pa. P4 .....5.80
Houston S5 .....4.95
Ind.Harbor,Ind. I-2, Y1 4.85
Johnstown,Pa. B2 .....4.85
Lackawanna,N.Y. B2 ..4.85
LoneStar,Tex. L6 .....5.20
Minnequa,Colo. C10 ....5.70
Munhall,Pa. U5 .....4.85
Newport,Ky. A2 .....4.85
Pittsburgh J5 .....4.85
Riverdale,Ill. A1 .....4.85
Seattle B3 .....5.75
Sharon,Pa. S3 .....4.85
S.Chicago,Ill. U5, W14 4.85
SparrowsPoint,Md. B2..4.85
Sterling,Ill. N19 .....4.85
Steubenville,O. W10 ....4.85
Warren,O. R2 .....4.85
Youngstown R2, U5, Y1.4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 ....6.20
Fontana,Calif. K1 .....7.00
Geneva,Utah C11 .....6.25
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron

Economy,Pa. B14 ....11.95

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.25
Bessemer,Ala. T2 .....7.25
Clairton,Pa. U5 .....7.25
Claymont,Del. C22 ....7.55
Cleveland J5, R2 .....7.25
Coatesville,Pa. L7 .....7.55
Conshohocken,Pa. A3 ..7.25
Ecorse,Mich. G5 .....7.35
Fairfield,Ala. T2 .....7.25
Fontana,Calif.(30) K1..8.00
Gary,Ind. U5 .....7.25
Geneva,Utah C11 .....7.25
Houston S5 .....7.35
Ind.Harbor,Ind. I-2, Y1..7.25
Johnstown,Pa. B2 .....7.25
Munhall,Pa. U5 .....7.25
Pittsburgh J5 .....7.25
Seattle B3 .....8.15
Sharon,Pa. S3 .....7.25
S.Chicago,Ill. U5, W14..7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 .....7.25
Youngstown U5, Y1 ....7.25

PLATES, Alloy

Aliquippa,Pa. J5 .....6.85
Claymont,Del. C22 ....6.85
Coatesville,Pa. L7 .....6.85
Fontana,Calif.(30) K1 ..7.60
Gary,Ind. U5 .....6.85
Houston S5 .....6.95
Ind.Harbor,Ind. Y1 ....6.85
Johnstown,Pa. B2 .....6.85
Munhall,Pa. U5 .....6.85
Newport,Ky. A2 .....6.85
Pittsburgh J5 .....6.85
Seattle B3 .....7.75
Sharon,Pa. S3 .....6.85
S.Chicago,Ill. U5, W14..6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 .....6.85

FLOOR PLATES

Cleveland J5 .....5.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 ....6.275
Ind.Harbor,Ind. I-2 ..5.925
Munhall,Pa. U5 .....5.925
S.Chicago,Ill. U5 ....5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10..5.10
Ashland l.c.l. (15) A10..5.60
Cleveland c.l. R2 .....5.60
Warren,O. c.l. R2 .....5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ..5.075
Aliquippa,Pa.(9) J5 ...5.075
Alton,Ill. L1 .....5.275
Atlanta(9) A11 .....5.275
Bessemer,Ala.(9) T2 ..5.075
Birmingham(9) C15 ..5.075
Bridgeport,Conn. N19 ..5.30
Buffalo(9) R2 .....5.075
Clairton,Pa.(9) U5 ....5.075
Cleveland(9) R2 .....5.075
Ecorse,Mich.(9) G5 ....5.175
Emeryville,Calif. J7 ....5.85
Fairfield,Ala.(9) T2 ..5.075
Fairless,Pa. (9) U5 ....5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 .....5.075
Houston(9) S5 .....5.325
Ind.Harbor(9) I-2, Y1..5.075
Johnstown,Pa.(9) B2 ..5.075
Joliet,Ill. P22 .....5.075
KansasCity,Mo.(9) S5..5.325
Lackawanna(9) B2 ....5.075
LosAngeles(9) B3 ....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ....5.525
Niles,Calif. P1 .....5.85
N.T'wanda,N.Y.(9)B11 5.425
Pittsburg,Calif.(9) C11.5.775
Pittsburgh(9) J5 .....5.075
Portland,Oreg. O4 ....5.825
Seattle B3, N14 .....5.825
S.Ch'c'go(9)R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5..5.075
S.SanFran.,Calif.(9)B3 5.825
Sterling,Ill.(1) N15 ....5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Tonawanda,N.Y. B12 ..5.45
Torrance,Calif.(9) C11 5.775
Youngstown (9) R2, U5 5.075

BARS, H.R. Leaded Alloy (Including leaded extra)

Warren,O. C17 .....7.125

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.125
Bethlehem,Pa. B2 ....6.125
Bridgeport,Conn. N19 ..6.20
Buffalo R2 .....6.125
Canton,O. R2 .....6.125
Clairton,Pa. U5 .....6.125
Detroit R7 .....6.125
Ecorse,Mich. G5 .....6.225
Fairless,Pa. U5 .....6.275
Fontana,Calif. K1 ....7.175
Gary,Ind. U5 .....6.125
Houston S5 .....6.375
Ind.Harbor,Ind. I-2, Y1..6.125
Johnstown,Pa. B2 .....6.125
KansasCity,Mo. S5 ....6.375
Lackawanna,N.Y. B2 ..6.125
LosAngeles B3 .....7.175
Massillon,O. R2 .....6.125
Midland,Pa. C18 .....6.125
Pittsburgh J5 .....6.125
S.Chicago R2,U5,W14 ..6.125
S.Duquesne,Pa. U5 ....6.125
Struthers,O. Y1 .....6.125
Warren,O. C17 .....6.125
Youngstown U5 .....6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....7.425
Bessemer,Ala. T2 .....7.425
Bethlehem,Pa. B2 .....7.425
Bridgeport,Conn. N19 ...7.50
Clairton,Pa. U5 .....7.425
Cleveland R2 .....7.425
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.425
Fontana,Calif. K1 ....8.125
Gary,Ind. U5 .....7.425
Houston S5 .....7.675
Ind.Harbor,Ind. Y1 ....7.425
Johnstown,Pa. B2 .....7.425
KansasCity,Mo. S5 ....7.675
Lackawanna,N.Y. B2 ..7.425
LosAngeles B3 .....8.125
Pittsburgh J5 .....7.425
Seattle B3 .....8.175
S.Chicago,Ill. U5, W14.7.425
S.Duquesne,Pa. U5 ....7.425
S.SanFrancisco B3 ....8.175
Struthers,O. Y1 .....7.425
Youngstown U5 .....7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2...5.225
Houston(9) S5 .....5.325
KansasCity,Mo.(9) S5..5.325
Lackawanna(9) B2 ....5.075
Sterling,Ill. N15 .....5.175
Sterling,Ill.(1) N15 ....5.075
Tonawanda,N.Y. B12 ...5.45

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....5.075
Atlanta A11 .....5.575
Joliet,Ill. P22 .....5.075
Niles,Calif. P1 .....5.85
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SanFrancisco S7 .....5.95

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.45
KansasCity,Mo. S5 .....6.45
Pittsburgh J5 .....6.20
Youngstown U5 .....6.20

BARS, C.F., Leaded Alloy (Including leaded extra)

Ambridge,Pa. W18 ....9.475
BeaverFalls,Pa. M12 ..9.475
Chicago W18 .....9.475
Cleveland C20 .....9.475
LosAngeles S30 .....11.10
LosAngeles P2 .....11.35
Monaca,Pa. S17 .....9.475
Newark,N.J. W18 .....9.65
Warren,O. C17 .....9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .....6.85
BeaverFalls,Pa. M12,R2.6.85
Birmingham C15 .....7.45
Bridgeport,Conn. N19 ..7.20
Buffalo B5 .....6.90
Camden,N.J. P13 .....7.30
Carnegie,Pa. C12 .....6.85
Chicago W18 .....6.85
Cleveland A7, C20 ....6.85
Detroit B5, P17 .....7.05
Detroit R7 .....6.85
Donora,Pa. W8 .....6.85
Elyria,O. W8 .....6.85
FranklinPark,Ill. N5 ...6.85
Gary,Ind. U5 .....6.85
GreenBay,Wis. F7 .....6.85
Hammond,Ind. L2, M13..6.85
Hartford,Conn. R2 .....7.35
Harvey,Ill. B5 .....6.85
LosAngeles(49) S30 ...8.30
LosAngeles R2 .....8.75
LosAngeles P2 .....8.30
Mansfield,Mass. B5 ....7.40
Massillon,O. R2, R8 ...6.85
Midland,Pa. C18 .....6.85
Monaca,Pa. S17 .....6.85
Newark,N.J. W18 .....7.30
NewCastle,Pa.(17) B4 ..6.85
Pittsburgh J5 .....6.85
Plymouth,Mich. P5 .....7.10
Putnam,Conn. W18 .....7.40
Readville,Mass. C14 ....7.40
S.Chicago,Ill. W14 .....6.85
SpringCity,Pa. K3 .....7.30
Struthers,O. Y1 .....6.85
Waukegan,Ill. A7 .....6.85
Youngstown F3, Y1 .....6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19.6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....8.325
BeaverFalls,Pa. M12,R2 8.325
Bethlehem,Pa. B2 .....8.325
Bridgeport,Conn. N19 ..8.475
Buffalo B5 .....8.325
Camden,N.J. P13 .....8.50
Canton,O. T7 .....8.325
Carnegie,Pa. C12 .....8.325
Chicago W18 .....8.325
Cleveland A7, C20 ....8.325
Detroit B5, P17 .....8.525
Detroit R7 .....8.325
Donora,Pa. A7 .....8.325
Elyria,O. W8 .....8.325
FranklinPark,Ill. N5 ..8.325
Gary,Ind. R2 .....8.325
GreenBay,Wis. F7 .....8.325
Hammond,Ind. L2,M13 8.325
Hartford,Conn. R2 ....8.625
Harvey,Ill. B5 .....8.325
Lackawanna,N.Y. B2 ..8.325
LosAngeles S30 .....10.10
LosAngeles P2 .....10.20
Mansfield,Mass. B5 ....8.625
Massillon,O. R2, R8 ...8.325
Midland,Pa. C18 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
Plymouth,Mich. P5 .....8.525
S.Chicago W14 .....8.325
SpringCity,Pa. K3 .....8.50
Struthers,O. Y1 .....8.325
Warren,O. C17 .....8.325
Waukegan,Ill. A7 .....8.325
Worcester,Mass. A7 ....8.625
Youngstown F3, Y1 ....8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.075
Atlanta A11 .....5.275
Birmingham C15 .....5.075
Bridgeport,Conn. N9 ...5.30
Buffalo R2 .....5.075
Cleveland R2 .....5.075
Ecorse,Mich. G5 .....5.425
Emeryville,Calif. J7 ...5.85

Fairfield,Ala. T2 ....5.075
Fairless,Pa. U5 .....5.225
Fontana,Calif. K1 ....5.775
Ft.Worth,Tex. (4) T4..5.525
Gary,Ind U5 .....5.075
Houston B5 .....5.325
Ind.Harbor,Ind. I-2 Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.075
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ...5.525
Niles,Calif. P1 .....5.85
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 ....5.85
SandSprings,Okla. S5 ..5.575
Seattle B3, N14 .....5.825
S.Chicago,Ill. R2 ....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2 .5.075
Sterling,Ill.(1) N15 ..5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Tonawanda,N.Y. B12 ..5.65
Torrance,Calif. C11 ..5.775
Youngstown R2, U5 ...5.075

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.30
Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Mo. S5 ....7.00
Lackawanna,N.Y. B2 ..6.50
Marion,O. P11 .....6.70
New York U8 .....7.20
Pittsburgh J5, U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ¼-1" B2 ..6.73
Williamsport,Pa. B19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.075
ChicagoHts.(4)(44) I-2 5.075
ChicagoHts.(4) C2 ....5.075
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(3) F5 ....5.10
Franklin,Pa.(4) F5 ...5.075
JerseyShore Pa.(4) J8 ..5.50
Marion,O.(3) P11 .....5.10
Moline,Ill.(3) R2 ....5.225
Tonawanda(3) B12 ....5.15
Tonawanda(4) B12 ....5.65
Williamsport,Pa.(3) B19 5.15

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 13.15
Economy,Pa.(D.R.)B14 16.35
Economy(Staybolt)B14, 16.80
McK.Rks(S.R.) L5 ...13.15
McK.Rks.(D.R.) L5 ..18.00
McK.Rks.(Staybolt) L5 19.15

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ....4.675
Allenport,Pa. P7 ....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 .....4.675
Conshohocken,Pa. A3..4.725
Detroit(8) M1 .....4.775
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.525
Gary,Ind. U5 .....4.675
Geneva,Utah C11 ....4.775
GraniteCity,Ill(8) G4..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Irvin,Pa. U5 .....4.675
Lackawanna,N.Y. B2..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) A2 ..4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 ....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2 .4.675
Steubenville,O. W10 ..4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ...4.675

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Irvin,Pa. U5 .....7.75
Newport,Ky. A2 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 ....7.75
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Irvin,Pa. U5 .....6.90
Lackawanna(35) B2 ....6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2 ..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ..4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ..5.80
Detroit, M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 .....7.00
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Irvin,Pa. U5 .....5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. A2 .....5.75
Pittsburg,Calif. C11 ....6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
SparrowsPoint,Md. B2 ..5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Yorkville,O. W10 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.775
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1 .8.525
Irvin,Pa. U5 .....8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 .8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	6.65	7.15
Fairfield T2	6.65	6.90
Gary,Ind. U5	6.65	6.90
GraniteCity,Ill. G4	6.85	...
Ind.Harbor I-2	6.65	6.90
Irvin,Pa. U5	6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pittsburgh J5	6.65	...
Pitts.,Calif. C11	7.40	...
SparrowsPt. B2	6.65	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....6.90
MartinsFry.,O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 ....6.30†
Canton,O. R2 .....6.50‡
Dover,O. R1 .....6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ..6.30†
Irvin,Pa. U5 .....6.30†
Kokomo,Ind. C16 ....6.40‡
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ...6.30†
Pittsburg,Calif. C11 ...7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ..6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.025

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Irvin,Pa. U5 .....6.70

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland (28) R2 ....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.65

SHEETS, Enameling Iron

Ashland,Ky. A10 ....6.325
Cleveland R2 .....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Irvin,Pa. U5 .....6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.35
Ind.Harbor,Ind. I-2 ...8.175
Yorkville,O. W10 ....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division, Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W.Co.
N19 Northeastern Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.875
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.875
Bessemer,Ala. T2	4.675
Birmingham C15	4.675
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.525
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity,Mo. S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. A2	7.75
Sharon,Pa. S3	7.75
S.Chicago,Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Evanston,Ill. M22	6.95
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.70
FranklinPark,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
LosAngeles C1	8.90
NewBedford,Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NowKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
Trenton,N.J.(31) R5	8.30
Wallingford,Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.55
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Sharon,Pa. S3	10.00
Warren,O. R2	10.00
Weirton,W.Va. W6	10.00
Youngstown Y1	10.20

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, C.R. Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Evanston,Ill. M22	6.95
Riverdale,Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.20	10.40	12.60	15.60	18.55
Boston T6	9.20	10.40	12.60	15.60	18.55
Bristol,Conn. W1	....	10.40	12.60	15.60	18.55
Carnegie,Pa. S18	8.65	10.10	12.30	15.30	....
Cleveland A7	8.65	10.10	12.30	15.30	18.25
Cleveland C7	...	10.10	12.30	15.30	18.25
Dearborn,Mich. D3	8.75	10.20	12.40	....	....
Detroit D2	8.75	10.20	12.40	15.40	....
Dover,O. G6	8.65	10.10	12.30	15.30	18.25
Evanston,Ill. M22	8.65	10.10	12.30	....	....
FranklinPark,Ill. T6	8.75	10.10	12.30	15.30	18.25
Harrison,N.J. C18	...	....	12.60	15.60	18.55
Indianapolis C8	8.80	10.25	12.30	15.30	18.25
LosAngeles C1	10.85	12.30	14.50	....	....
NewBritain,Conn.(10) S15	8.65	10.10	12.30	15.30	18.25
NewCastle,Pa. B4, E5	8.65	10.10	12.30	15.30	....
NewHaven,Conn. D2	9.10	10.40	12.60	15.60	....
NewKensington,Pa. A6	8.65	10.10	12.30	15.30	....
New York W3	...	10.40	12.60	15.60	18.55
Pawtucket,R.I. N8	9.20	10.40	12.60	15.60	18.55
Riverdale,Ill. A1	8.75	10.10	12.30	15.30	18.25
Rome,N.Y.(32) R6	8.65	10.10	12.30	15.30	18.25
Sharon,Pa. S3	8.65	10.10	12.30	15.30	18.25
Trenton,N.J. R5	...	10.40	12.60	15.60	18.55
Wallingford,Conn. W2	9.10	10.40	12.60	15.60	18.45
Warren,O. T5	8.65	10.10	12.30	15.30	18.25
Worcester,Mass. A7, T6	9.20	10.40	12.60	15.60	18.55
Youngstown C8	8.65	10.10	12.30	15.30	18.25

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	17.10	20.95	25.30
Buffalo W12	...	...	17.10	....	....
FranklinPark,Ill. T6	...	...	17.45	21.30	25.65
Harrison,N.J. C18	...	...	17.10	20.95	25.30
New York W3	...	...	17.10	20.95	25.30
Palmer,Mass. W12	...	...	17.10	....	....
Trenton,N.J. R5	...	...	17.10	20.95	25.30
Worcester,Mass. A7, T6	...	...	17.10	20.95	25.30
Youngstown C8	...	...	17.45	21.30	25.65

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	....	11.00	12.05	13.05
Brackenridge,Pa. A4	...	....	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. A2	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FF coils)	...	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SPcoils)	...	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed 1½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	....	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	....
IndianaHarbor,Ind. I-2	9.20†	10.35*	11.025*	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	...	10.85†	11.525†	12.575†	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	....
Butler,Pa. A10	....	....	....	18.50	19.00	19.50	....
Vandergrift,Pa. U5	..	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	....	14.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.40	$8.65	$9.05
Fairfield,Ala. T2	8.50	8.75	9.15
Fairless,Pa. U5	8.50	8.75	9.15
Fontana,Calif. K1	9.15	9.40	9.80
Gary,Ind. U5	8.40	8.65	9.05
GraniteCity,Ill. G4	8.50	8.75	9.15
IndianaHarbor,Ind. I-2, Y1	8.40	8.65	9.05
Irvin,Pa. U5	8.40	8.65	9.05
Niles,O. R2	8.40	8.65	9.05
Pittsburg,Calif. C11	9.15	9.40	9.80
SparrowsPoint,Md. B2	8.50	8.75	9.15
Weirton,W.Va. W6	8.40	8.65	9.05
Yorkville,O. W10	8.40	8.65	9.05

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.425	7.625	....
Niles,O. R2	7.425	7.625	7.925

TINPLATE, American lb	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.70	$9.95
Fairfield,Ala. T2	9.80	10.05
Fairless,Pa. U5	9.80	10.05
Fontana,Calif. K1	10.45	10.70
Gary,Ind. U5	9.70	9.95
Irvin,Pa. U5	9.70	9.95
Pitts.,Calif. C11	10.45	10.70
Sp.Pt.,Md. B2	9.80	10.05
Weirton,W.Va. W6	9.70	9.95
Yorkville,O. W10	9.70	9.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.50
Fairfield,Ala. T2	7.60
Fairless,Pa. U5	7.60
Fontana,Calif. K1	8.25
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. I-2, Y1	7.50
Irvin,Pa. U5	7.50
Niles,O. R2	7.50
Pittsburg,Calif. C11	8.25
SparrowsPoint,Md. B2	7.60
Weirton,W.Va. W6	7.50
Yorkville,O. W10	7.50

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Irvin,Pa. U5	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Gary,Ind. U5	$9.20
Irvin,Pa. U5	9.20

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda,N.Y. B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	11.90
Buffalo W12	11.90
Cleveland A7	11.90
Donora,Pa. A7	11.90
Duluth A7	11.90
Johnstown,Pa. B2	11.90
Minnequa,Colo. C10	12.025
Monessen,Pa. P16	11.90
Muncie,Ind. I-7	12.10
NewHaven,Conn. A7	12.20
Palmer,Mass. W12	12.20
Pittsburg,Calif. C11	12.70
Portsmouth,O. P12	11.90
Roebling,N.J. R5	12.20
SparrowsPt.,Md. B2	12.00
Struthers,O. Y1	11.90
Trenton,N.J. A7	12.20
Waukegan,Ill. A7	11.90
Worcester,Mass. A7	12.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.70
Alton,Ill. L1	8.90
Buffalo W12	8.70
Cleveland A7	8.70
Donora,Pa. A7	8.70
Duluth A7	8.70
Johnstown,Pa. B2	8.70
KansasCity,Mo. S5	8.95
Minnequa,Colo. C10	8.90
LosAngeles B3	9.65
Monessen,Pa. P7, P16	8.70
NewHaven,Conn. A7	9.00
Palmer,Mass. W12	9.00
Pittsburg,Calif. C11	9.65
Portsmouth,O. P12	8.70
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.70
S.SanFrancisco C10	9.65
SparrowsPt.,Md. B2	8.80
Struthers,O. Y1	8.70
Trenton,N.J. A7	9.00
Waukegan,Ill. A7	8.70
Worcester,Mass. A7	9.00

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	9.025
Alton,Ill. L1	9.225
Bartonville,Ill. K4	9.125
Buffalo W12	9.025
Cleveland A7	9.025
Donora,Pa. A7	9.025
Duluth A7	9.025
Fostoria,O. S1	9.075
Johnstown,Pa. B2	9.025
LosAngeles B3	9.975
Milbury,Mass.(12) N6	9.325
Minnequa,Colo. C10	9.275
Monessen,Pa. P7, P16	9.025
Muncie,Ind. I-7	9.225
Palmer,Mass. W12	9.325
Pittsburg,Calif. C11	9.975
Portsmouth,O. P12	9.025
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	9.025
S.SanFrancisco C10	9.975
SparrowsPt.,Md. B2	9.125
Struthers,O. Y1	9.025
Trenton,N.J. A7	9.325
Waukegan,Ill. A7	9.025
Worcester J4, T6, W12	9.325
Worcester,Mass. A7	9.325

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	14.35
Bartonville,Ill. K4	14.25
Buffalo W12	14.45
Chicago W13	14.45
Cleveland A7	14.45
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.45
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.45
Kokomo,Ind. C16	14.45
Monessen,Pa. P6	14.20
Muncie,Ind. I-7	14.65
Palmer,Mass. W12	14.75
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.80
Waukegan,Ill. A7	14.45
Worcester,Mass. A7, T6	14.75

ROPE WIRE

Bartonville,Ill. K4	12.00
Buffalo W12	12.00
Fostoria,O. S1	12.00
Johnstown,Pa. B2	12.00
Monessen,Pa. P7	11.55
Muncie,Ind. I-7	12.20
Palmer,Mass. W12	12.30
Portsmouth,O. P12	12.00
Roebling,N.J. R5	12.30
SparrowsPt.,Md. B2	12.10
Struthers,O. Y1	12.00
Worcester,Mass. J4	12.30

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	15.75
Monessen,Pa. P16	15.45
Roebling,N.J. R5	16.10

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Chicago W13	10.85
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	11.05
FranklinPark,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester,Mass. A7, T6	11.05

NAILS & POLISHED STAPLES, Stock

	Col.
AlabamaCity,Ala. R2	.164
Aliquippa,Pa. J5	.164
Atlanta A11	.166
Bartonville,Ill. K4	.166
Crawfordsville,Ind. M8	.166
Donora,Pa. A7	.164
Duluth A7	.164
Fairfield,Ala. T2	.164
Houston,Tex. S5	.169
Jacksonville,Fla. (20) M8	175
Johnstown,Pa. B2	.164
Joliet,Ill. A7	.164
KansasCity,Mo. S5	.169
Kokomo,Ind. C16	.166
Minnequa,Colo. C19	.169
Monessen,Pa. P7	.164
Pittsburg,Calif. C11	.183
Rankin,Pa. A7	.164
S.Chicago,Ill. R2	.164
SparrowsPt.,Md. B2	.166
Sterling,Ill. (7) N15	.166
Worcester,Mass. A7	.170

NAILS, Stock

	Col.
Chicago W13	.164
Cleveland A9	.170

(To Wholesalers; per cwt)

Galveston,Tex. D7	$3.75

NAILS, Cut (100 lb keg) To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)

Coil No. 3150

AlabamaCity,Ala. R2	$9.53
Atlanta A11	9.63
Bartonville,Ill. K4	9.63
Buffalo W12	9.93
Chicago W13	9.82
Crawfordsville,Ind. M8	9.63
Donora,Pa. A7	9.82
Duluth A7	9.82
Fairfield,Ala. T2	9.82
Houston S5	10.07
Jacksonville,Fla. M8	10.09
Johnstown,Pa. B2	9.82
Joliet,Ill. A7	9.82
KansasCity,Mo. S5	10.07
Kokomo,Ind. C16	9.92
LosAngeles B3	10.61
Minnequa,Colo. C10	10.07
Pittsburg,Calif. C11	10.60
S.Chicago,Ill. R2	9.53
S.SanFrancisco C10	10.60
SparrowsPt.,Md. B2	9.92
Sterling,Ill.(37)N15	9.82

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.85
Atlanta A11	9.95
Bartonville,Ill. K4	9.95
Buffalo W12	10.25
Chicago W13	10.15
Crawfordsville,Ind. M8	9.95
Donora,Pa. A7	10.15
Duluth A7	10.15
Fairfield,Ala. T2	10.15
Houston S5	10.40
Jacksonville,Fla. M8	10.41
Johnstown,Pa. B2	10.15
Joliet,Ill. A7	10.15
KansasCity,Mo. S5	10.40
Kokomo,Ind. C16	10.25
Los Angeles B3	10.95
Minnequa,Colo. C10	10.40
Pittsburg,Calif. C11	10.95
S.Chicago,Ill. R2	9.85
S.SanFrancisco C10	10.95
SparrowsPt.Md. B2	10.25
Sterling,Ill.(37) N15	10.15

Coil Interim

AlabamaCity,Ala. R2	$9.90
Atlanta A11	10.00
Bartonville,Ill. K4	10.00
Buffalo W12	10.30
Chicago W13	10.20
Crawfordsville,Ind. M8	10.00
Donora,Pa. A7	10.20
Duluth A7	10.20
Fairfield,Ala. T2	10.20
Houston S5	10.45
Jacksonville,Fla. M8	10.46
Johnstown,Pa. B2	10.20
Joliet,Ill. A7	10.20
KansasCity,Mo. S5	10.45
Kokomo,Ind. C16	10.30
LosAngeles B3	11.00
Minnequa,Colo. C10	10.45
Pittsburg,Calif. C11	11.00
S.Chicago,Ill. R2	9.90
S.SanFrancisco C10	11.00
SparrowsPt.,Md. B2	10.30
Sterling,Ill. (37) N15	10.20

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	.190
Atlanta A11	.192
Bartonville,Ill. K4	.192
Crawfordsville,Ind. M8	.192
Donora,Pa. A7	.196
Duluth A7	.196
Fairfield,Ala. T2	.196
Houston S5	.195
Jacksonville,Fla. M8	.197
Joliet,Ill. A7	.190
KansasCity,Mo. S5	.195
Kokomo,Ind. C16	.193
Minnequa,Colo. C10	.193
Pittsburg,Calif. C11	.220
S.Chicago,Ill. R2	.190
S.SanFrancisco C10	.214
Sterling,Ill. (7) N15	.196
SparrowsPt.,Md. B2	.198
Tonawanda,N.Y. B12	.169
Williamsport,Pa. S19	.175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	.167
Duluth A7	.167
Franklin,Pa. F5	.167
Huntington,W.Va. W7	.169
Johnstown,Pa. B2	.167
Marion,O. P11	.167
Minnequa,Colo. C10	.172
Sterling,Ill.(1) N15	.167
Tonawanda,N.Y. B12	.169
Williamsport,Pa. S19	.175

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	.184**
Aliquippa,Pa. J5	.1811
Atlanta A11	.190*
Bartonville,Ill. K4	.190
Crawfordsville,Ind. M8	.190
Donora,Pa. A7	.1841
Duluth A7	.1841
Fairfield,Ala. T2	.1841
Houston,Tex. S5	.189**
Jacksonville,Fla. M8	.195
Johnstown,Pa. B2	.1881
Joliet,Ill. A7	.1841
KansasCity,Mo. S5	.189**
Kokomo,Ind. C16	.1861
Minnequa,Colo. C10	.189**
Monessen,Pa. P7	.1881
Pittsburg,Calif. C11	.2041
Rankin,Pa. A7	.1841
S.Chicago,Ill. R2	.184**
S.SanFrancisco C10	.204**
SparrowsPoint,Md. B2	190*
Sterling,Ill.(7) N15	.190*

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	.176**
Aliq'ppa,Pa. 9-14½ga. J5	1791
Atlanta A11	.182*
Bartonville,Ill. K4	.182
Crawfordsville,Ind. M8	.182
Donora,Pa. A7	.1761
Duluth A7	.1761
Fairfield,Ala. T2	.1761
Houston,Tex. S5	.181**
Jacksonville,Fla. M8	.187
Johnstown,Pa.(43) B2	.180*
Joliet,Ill. A7	.1761
KansasCity,Mo. S5	.181**
Kokomo,Ind. C16	.1781
Minnequa,Colo. C10	.181**
Monessen,Pa. 9 ga. P7	.180*
Pittsburg,Calif. C11	.1991
Rankin,Pa. A7	.1761
S.Chicago,Ill. R2	.176**
Sterling,Ill.(7) N15	.182*

WIRE (16 gage)	An'ld Galv. Stone	Galv. Stone
Al...City,Ala.R2	15.70	17.25**
Aliq'ppa,Pa. J5	..15.70	17.50
Bartonville K4	..15.80	17.75
Buffalo W12	....16.10	....
Cleveland A7	....16.00	....
Crawf'dsville M8	15.80	17.75
Fostoria,O. S1	..16.50	18.05†
Houston S5	...15.95	17.50**
Jacksonville M8	..16.05	18.00
Johnstown B2	..16.00	17.95*
Kan.City,Mo. S5	15.95	....
Kokomo C16	....16.10	17.65†
Minnequa C10	..16.25	17.80*
P'lm'r,Mass.W12	16.30	17.85†
Pitts.,Calif. C11	16.35	17.90†
SparrowsPt. B2	16.10	18.05*
Sterling(37) N15	16.00	17.95*
Waukegan A7	..16.00	17.55†
Worcester A7	..16.30	....

WIRE, Merchant Quality (6 to 8 gage) An'ld Galv.

Ala.City,Ala. R2	7.95 8.35**
Aliquippa J5	....7.95 8.475‡
Atlanta (48) A11	8.05 8.65*
Bartonville(48)	K4..8.05 8.65
Buffalo W12	....8.20 8.75†
Cleveland A7	....8.20 ....
Crawfordsville M8	..8.05 8.65
Donora,Pa. A7	..8.20 8.75†
Duluth A7	....8.20 8.75†
Fairfield T2	....8.20 8.75†
Houston(48) S5	..8.45 9.00**
Jacks'ville,Fla.	M8 8.30 8.90
Johnstown B2(48)	8.20 8.95*
Joliet,Ill. A7	....8.20 8.75†
Kans.City(48) S5	8.45 9.60**
Kokomo C16	....8.30 8.85†
LosAngeles B3	..9.15 9.90*
Minnequa C10	....8.45 9.00‡
Monessen P7(48)	..7.95 8.55*
Palmer,Mass. W12	8.50 9.05†
Pitts.,Calif. C11	...9.15 9.70†
Rankin,Pa. A7	...8.20 8.75†
S.Chicago R2	...7.95 8.35**
S.SanFran. C10	..9.15 9.70**
Spar'waPt. B2(48)	8.30 9.05*
Sterling(37)(48)N15	8.35 9.10
Struth'rs,O.(48)Y1	8.20 8.85‡
Worcester,Mass. A7	8.50 9.05†

Based on zinc price of: *13.50c. †5c. ‡10c. §Less than 10c. ††13c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter	52.5
Lower than 6 in.	43.5
⅝ in. thru 1 in:	
6 in. and shorter	43.5
Longer than 6 in.	41.5
1⅛ in. and larger:	
All lengths	41.5

Undersized Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	52.5

Carriage, Machine, Lag Bolts Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	32.0
Longer than 6 in.	19.0
⅝ in. thru 1 in.:	
6 in. and shorter	16.0
Longer than 6 in.	16.0
1⅛ in. and larger:	
All lengths	16.0

Lag Bolts

All diameters:	
6 in. and shorter	52.5
Longer than 6 in.	44.5

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	52.0
Larger than ½ in. or longer than 6 in.	44.5

Blank Bolts 44.5

Step, Elevator, Tire Bolts 52.0

Stove Bolts, Slotted

¼ to ¼-in., incl., 3 in. and shorter	54.00
⅛ to ⅜-in., inclusive	54.00

NUTS

Reg. & Heavy Square Nuts:

All sizes	58.0

Square Nuts, Reg. & Heavy, Hot Galvanized:

All sizes	44.0

Hex Nuts, Reg. & Heavy, Hot Pressed:

⅜ in. and smaller	61.5
⅞ in. to 1 in., incl.	57.5
1⅛ in. to 1½ in., incl.	62.5
1⅝ in. and larger	56.0

Hex Nuts, Reg. & Heavy, Cold Punched:

⅜ in. and smaller	61.5
⅞ in. to 1½ in., incl.	57.5
1⅝ in. and larger	56.0

Hex Nuts, All Types, Hot Galvanized:

⅜ in. and smaller	48.0
⅞ in. to 1 in., incl.	44.0
1⅛ in. to 1½ in., incl.	49.0

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

⅜ in. and smaller	61.5
⅞ in. to 1½ in., incl.	57.5
1⅝ in. and larger	56.0

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller	64.00
1⅛ in. to 1½ in., incl.	60.5
1⅝ in. and larger	56.0

Semifinished Hex Nuts, Reg. (Including Slotted):

⅜ in. and smaller	61.5
⅞ in. to 1-in., incl.	64.0
1⅛ in. to 1.5-in., incl.	60.5
1⅝ in. and larger	56.0

CAP AND SET SCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:

⅜ in. and smaller	44.0
⅞, ⅝ and 1 in diam.	27.0

Longer than 6 in.:

⅜ in. and smaller	14.0
⅞, ⅝ and 1 in. diam.	0.5

High Carbon, Heat Treated:

6 in. and shorter:

⅜ in. and smaller	31.0
⅞, ⅝ and 1 in. diam.	9.0

Longer than 6 in.:

⅜ in. and smaller	+6
⅞, ⅝ and 1 in. diam.	+24

Flat Head Cap Screws:

⅜ in. and smaller	+65.0

Set Screws, Square Head, Cup Point, Coarse Thread

Through 1 in. diam.:

6 in. and shorter	11
Longer than 6 in.	+10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 11.80

⅞-in. under List less 23%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	24.55	23.54
1¼	13	....	29.07	23.36
1½	13	27.45	32.14	25.83
1¾	13	32.43	37.97	30.51
2	13	36.34	42.56	34.20
2¼	13	40.93	47.94	38.52
2½	12	44.42	52.03	41.81
2¾	12	48.94	57.31	46.05
3	12	52.99	62.05	49.88
3½	12	56.51	66.18	53.19

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.275	5.175	5.225	6.25
Ensley,Ala. T2	5.275	5.175	....	6.25
Fairfield,Ala. T2	....	....	....	6.25
Huntington,W.Va. C15	....	....	....	6.25
Gary,Ind. U5	5.275	5.175	5.225	...
IndianaHarbor,Ind. I-2	5.275	5.175	5.225	...
Johnstown,Pa. B2	....	....	...(16)	6.25
Lackawanna,N.Y. B2	5.275	5.175	....	6.25
Minnequa,Colo. C10	5.275	5.175	....	6.75
Steelton,Pa. B2	5.275	5.175	....	...
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.275
Gary,Ind. U5	6.275
Ind.Harbor,Ind. I-2	6.275
Lackawanna,N.Y. B2	6.275
MInnequa,Colo. C10	6.275
Seattle B3	6.425
Steelton,Pa. B2	6.275
Torrance,Calif. C11	6.425

JOINT BARS

Bessemer,Pa. U5	6.60
Fairfield,Ala. T2	6.60
Ind.Harbor,Ind. I-2	6.60
Joliet,Ill. U5	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Steelton,Pa. B2	6.60

AXLES

Ind.Harbor,Ind. S13	8.35
Johnstown,Pa. B2	8.35

TRACK BOLTS, Untreated

Cleveland R2	13.85
KansasCity,Mo. S5	13.85
Lebanon,Pa. B2	13.85
Minnequa,Colo. C10	13.85
Pittsburgh P14	13.10
Seattle B3	14.35

SCREW SPIKES

Lebanon,Pa. B2	13.60
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.225
Ind.Harbor,Ind. I-2,Y1	9.225
KansasCity,Mo. S5	9.225
Lebanon,Pa. B2	9.225
Minnequa,Colo. C10	9.225
Pittsburgh J5	9.225
Seattle B3	9.725
S.Chicago,Ill. R2	9.225
Struthers,O. Y1	9.225
Youngstown R2	9.225

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 5/16 in.; 6.25c; 1 15/16 to 3 in.; inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.142 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delite-reel in mill zone, 5.625c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.20c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.625c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 9.85c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Ambridge, Pa. N2	+5.25	....	1.25	....	3.75	....	5.25	....	5.25	....	5	....	7.5	....
Lorain, O. N3	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Youngstown Y1	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		8c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Alton, Ill. L1	....	....	....	....	....	....	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Benwood, W. Va. W10	6.5	+24	+4.75	+32.25	+14.75	+42.25	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Butler, Pa. F8	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Fairless, Pa. N3	....	....	....	....	....	....	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Fontana, Calif. K1	....	....	....	....	....	....	+3.75	+23	+0.75	+19	2.75	+14.5	5.25	+12.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	8.25	+11	11.25	+7	14.75	+2.5	17.25	+0.75
Lorain, O. N3	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sharon, Pa. S4	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sparrows Pt., Md. B2	5.5	+25	+0.5	+32.5	+14.5	+42	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Wheatland, Pa. W9	7.5	+23	+3	+30.5	+12.5	+40	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Youngstown R2, Y1	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25

Size—Inches	1⅛		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Alton, Ill. L1	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	....	....	....	....
Benwood, W. Va. W10	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Etna, Pa. N2	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Fairless, Pa. N3	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Fontana, Calif. K1	5.75	+11.75	6.25	+11.25	7.75	+10.5	7.75	+10.5	+2.75	+21.5	+2.75	+21.5
Indiana Harbor, Ind. Y1	17.75	0.25	18.25	0.75	19.75	1.5	19.25	1.5	9.25	+9.5	9.25	+9.5
Lorain, O. N3	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sharon, Pa. M6	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sparrows Pt., Md. B2	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Wheatland, Pa. W9	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Youngstown R2, Y1	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	21.25	26.00	....	34.50	....	40.50	42.50	46.75	43.25
202	22.75	29.00	35.00	37.50	39.25	41.25	43.25	47.25	47.25
301	22.25	27.00	35.75	35.75	40.25	42.50	44.50	49.25	45.75
302	24.25	30.25	36.50	39.00	41.00	43.25	45.50	50.00	50.00
302B	24.50	31.50	39.25	44.00	43.25	45.50	47.50	54.75	54.75
303	....	30.75	39.50	....	44.00	46.25	48.00	54.50	54.50
304	26.00	32.00	39.00	42.50	43.75	46.00	48.75	53.25	53.25
304L	....	....	46.50	49.50	51.25	53.50	56.25	60.75	60.75
305	27.50	35.25	40.75	45.75	43.75	46.00	49.25	56.50	56.50
308	29.50	36.75	45.50	48.25	50.75	53.50	58.00	60.50	60.50
309	38.25	47.50	55.50	62.00	61.25	64.50	68.25	77.50	77.50
310	47.75	59.25	75.00	81.00	83.25	87.50	89.25	93.00	93.00
314	....	....	....	....	83.25	....	80.25	....	100.50
316	38.25	47.50	59.75	68.50	66.75	70.25	73.75	78.25	78.25
316L	....	....	67.25	73.00	74.25	77.75	81.25	85.75	85.75
317	46.25	57.75	73.75	84.75	83.00	87.25	90.00	97.00	97.00
321	31.00	38.50	45.25	51.50	50.50	53.25	57.50	63.00	63.00
18-8 CbTa	35.50	44.75	53.50	61.00	59.25	62.25	67.00	76.25	76.25
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.75	36.25	....	40.50	42.50	44.25	53.75	53.75
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	35.50
304	33.15	36.20	40.30	44.50	37.75
304-L	35.40	38.80	43.15	47.65	....
316	38.35	41.90	45.90	50.15	55.50
316-L	43.55	47.60	52.70	57.85	....
316-Cb	43.85	48.10	53.40	58.75	....
321	34.90	37.95	42.10	46.40	44.75
347	37.05	41.25	46.45	51.70	54.25
405	27.55	29.20	33.15	37.05	....
410	27.00	28.70	32.65	36.55	....
430	27.00	28.70	32.65	36.55	....
Inconel	47.28	57.90	68.50	79.20	....
Nickel	40.00	50.30	60.65	71.05	....
Nickel, Low Carbon	40.30	50.95	61.65	72.50	....
Monel	41.70	51.90	62.15	72.40	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.00	39.85

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

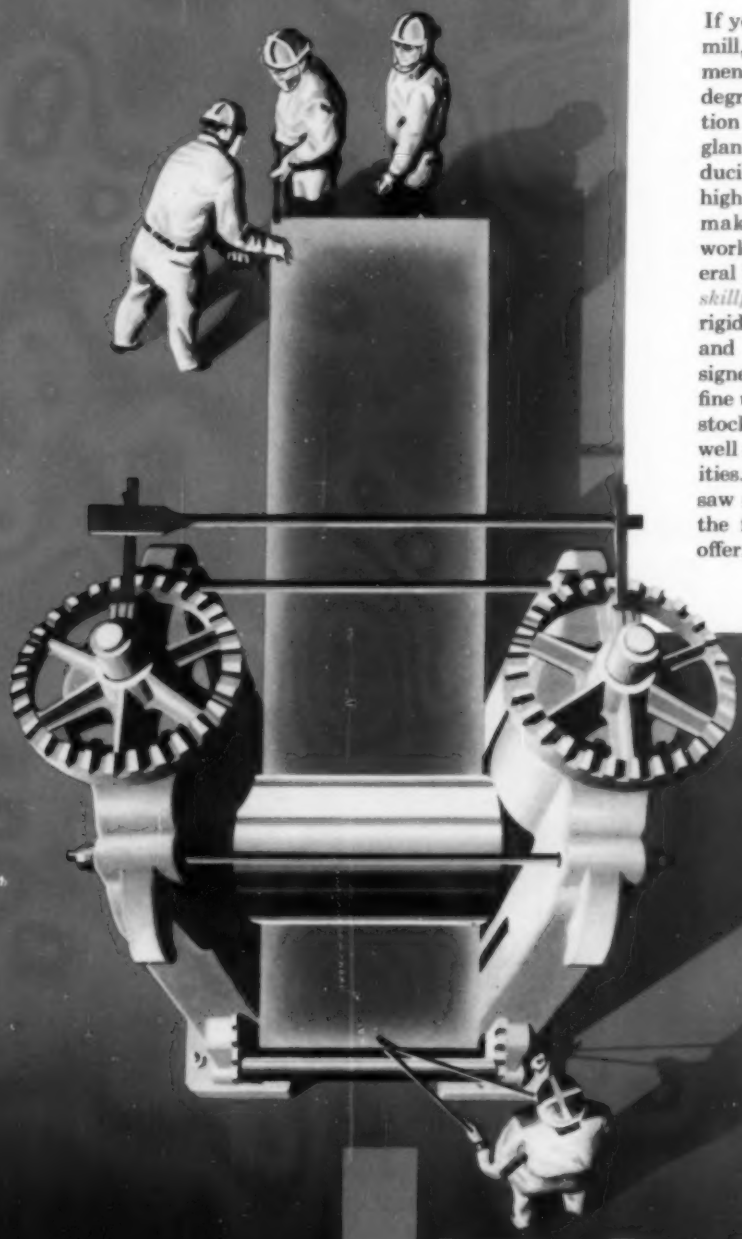
Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.43-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	....	....	4.170
18.25	4.25	1	4.75	....	....	2.385
18	4	2	9	....	....	2.755
18	4	2	....	....	....	1.845
18	4	1	....	....	....	1.680
9	3.5	..	....	....	....	1.275
13.5	4	3	....	....	....	1.945
13.75	3.75	2	5	....	....	2.325
6.4	4.5	1.9	....	5	....	1.185
6	4	3	....	6	....	1.430
1.5	4	1	....	8.5	....	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

How Jessop skill makes better saw steel



If you could peer down into the Jessop mill, chances are you'd see groups of men hand-rolling sheets of steel with a degree of skill and careful concentration that might seem excessive at first glance. *Yet it isn't.* These men are producing a very special steel—top quality high-speed sheet which is used in the making of hack-saw blades, woodworking tools, metal-slitting saws, general industrial knives, and the like. But *skillful finish rolling isn't all.* Jessop rigidly controls its melting formulas and pours small ingots specially designed for cross rolling. This insures a fine uniform grain structure so that the stock blanks well, forms well, swages well and has superior edge holding qualities. Remember, when you order your saw steel from Jessop, you are buying the finest that Jessop experience can offer. *And that's mighty fine steel.*

JESSOP

STEEL COMPANY · WASHINGTON, PENNSYLVANIA

OFFICES IN PRINCIPAL CITIES

Jessop Steel of Canada Limited, Wallaceburg, Toronto

Jessop Steel International Corp., Chrysler Building, New York, New York

"Harry, why did the boss switch to Dow Trichloroethylene?"

"That's simple, Jess—he figures it does a better job."

"In what way?"

"High solvent power, high stability. Superior degreasing performance thoroughly removes oils, tars and resins. Special inhibitors keep it stable after repeated degreasing and distillation runs. All around high quality."

"Nothing low down about this solvent, eh, Harry?"

"On the contrary. Relatively low boiling point makes it easier to handle the work after degreasing. And the narrow boiling range indicates the purity of the solvent."

"Sounds like it will do a good job."

"That's right, Dow Trichloroethylene does a good cleaning job and is safe to handle, too. Classified as nonflammable and nonexplosive at ordinary temperatures. Doesn't produce a flash by either the closed cup or open cup test."

"Say, Harry, sounds like you're selling this stuff."

"I'm not, but Dow is."

"Who?"

"Dow. Same people who sell Dow Perchloroethylene Industrial for vapor degreasing, Dow Methylene Chloride for stripping and Chlorothene® for cold cleaning. THE DOW CHEMICAL COMPANY, Midland, Michigan."

YOU CAN DEPEND ON DOW

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W18	58.50**	59.00‡	63.00	....
Cincinnati, deld.	....	66.79	....	....
Buffalo District				
Buffalo H1, R2	64.50	65.00	65.50	66.00
Tonawanda,N.Y. W12	64.50	65.00	65.50	66.00
N.Tonawanda,N.Y. T9	....	65.00	65.50	66.00
Boston, deld.	75.79	76.29	76.79	....
Rochester,N.Y., deld.	67.52	68.02	68.52	....
Syracuse,N.Y., deld.	66.62	69.12	69.62	....
Chicago District				
Chicago I-3	64.50	65.00	65.00	65.50
S.Chicago,Ill. R2	64.50	....	65.00	....
S.Chicago,Ill. Y1	64.50	65.00	65.00	....
S.Chicago,Ill. W14	64.50	....	65.00	65.50
Milwaukee, deld.	66.96	67.46	67.46	67.96
Muskegon,Mich., deld.	....	73.83	73.83	....
Cleveland District				
Cleveland R2, A7	64.50	65.00	65.00	65.50
Akron,O., deld.	67.62	68.12	68.12	68.62
Mid-Atlantic District				
Birdsboro,Pa. B10	66.50	67.00	67.50	68.00
Chester,Pa. P4	66.50	67.00	67.50	....
Bwedeland,Pa. A3	66.50	67.00	67.50	68.00
New York, deld.	....	73.20	73.70	....
Newark,N.J., deld.	70.52	71.02	71.52	72.02
Philadelphia, deld.	68.38	68.88	69.38	69.88
Troy,N.Y. R2	66.50	67.00	67.50	68.00
Pittsburgh District				
NevilleIsland,Pa. P6	64.50	65.00	65.00	65.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	66.45	66.45	66.95
McKeesRocks,Pa., deld.	....	66.10	66.10	66.63
Lawrenceville, Homestead, Wilmerding,Monaca,Pa., deld.	....	66.76	66.76	67.26
Verona,Trafford,Pa., deld.	66.79	67.32	67.32	67.85
Brackenridge,Pa., deld.	67.10	67.60	67.60	68.13
Midland,Pa. C18	64.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	65.00	....
Sharpsville,Pa. S6	64.50	....	65.00	65.50
Youngstown Y1	....	....	65.00	65.50
Mansfield,O., deld.	69.40	....	69.90	70.40
Duluth I-3	64.50	65.00	65.00	65.50
Erie,Pa. I-3	64.50	65.00	65.00	65.50
Everett,Mass. E1	66.00	66.50	67.00	....
Fontana,Calif. K1	72.50	73.00	....	....
Geneva,Utah C11	64.50	65.00	....	....
GraniteCity,Ill. G4	66.40	66.90	67.40	....
Ironton,Utah C11	64.50	65.00	....	....
Minnequa,Colo. C10	66.50	67.00	67.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	64.50	65.00	65.00	65.50
Cincinnati, deld.	71.04	71.54	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.60%, $59.50.
‡Phos. 0.70-0.90%; Phos. 0.30-0.50%, $60.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extras; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	77.28
Buffalo H1	78.50

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$105.50
NiagaraFalls,N.Y. P15	105.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2	110.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	113.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	78.50
Troy,N.Y. R2 (Phos. 0.035% max)	72.50
Philadelphia, deld.	80.26
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	69.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.§	H.R. Alloy 4140††		Carbon	Floor
Atlanta	8.17‖	9.37‖	9.83‖	....	8.21	8.45	10.23	....	8.59	8.55	10.51
Baltimore	7.88	8.98	9.12	....	8.36	8.53	9.13[3]	14.68	8.75	8.26	9.76
Birmingham	7.80	9.00	9.52	....	7.82	8.07	10.12	....	8.20	8.16	10.31
Boston	8.84	9.88	11.06	60.42	8.89	9.07	....	14.69	9.10	9.18	10.68
Buffalo	7.85	9.00	10.75	....	8.06	8.25	8.70	14.50	8.50	8.50	10.06
Chattanooga	7.99	9.24	9.10	....	8.00	8.24	10.04	....	8.44	8.40	10.26
Chicago	7.80	9.00	9.70	53.25	7.82	8.07	8.35	14.15	8.20	8.16	9.49
Cincinnati	7.94	9.05	9.75	50.00	8.14	8.38	8.84	14.46	8.74	8.52	9.78
Cleveland	7.78	8.98	9.60	53.43	7.92	8.16	8.60	14.24	8.57	8.39	9.72
Denver	9.55	11.09	12.41	....	9.70	9.75	10.54	18.89	9.60	9.80	11.18
Detroit	8.03	9.25	10.05	59.50	8.17	8.37	8.70	14.41	8.74	8.51	9.74
Erie, Pa.	7.85	9.00	9.60[10]	....	7.95	8.20	8.70[10]	....	8.50	8.35	9.75
Houston	8.70	9.65	10.99	....	8.80	9.15	10.55	15.00	8.90	8.60	10.10
Jackson, Miss.	8.09	9.34	9.79	....	8.16	8.41	10.23	....	8.54	8.50	10.34
Los Angeles	9.10	10.80	11.65	57.45	9.15	9.05	12.10	15.50	9.15	9.65	11.99
Milwaukee	7.93	9.13	9.83	....	7.95	8.20	8.58	14.28	8.41	8.29	9.62
Moline, Ill.	8.05	9.25	10.05	....	8.13	8.26	8.70	....	7.78	8.36	....
New York	8.45	9.66	10.23	60.20	8.90	9.01	....	14.59	8.91	9.01	10.31
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.15	9.07	10.29	50.69	8.82	8.71	9.31	14.51	8.70	8.68	9.70
Pittsburgh	7.78	8.99	10.05	50.00	7.92	8.07	8.35	14.15	8.20	8.16	9.49
Portland, Oreg.	8.90	9.65	11.40	55.20	11.05‡‡	9.35	13.80	14.60	9.35	12.20‖‖	11.60
Richmond, Va.	8.00	....	10.14	....	8.55	8.40	10.00	....	8.95	8.40	9.90
St. Louis	8.14	9.34	10.06	73.36	8.19	8.43	8.96	14.51	8.67	8.52	9.86
St. Paul	8.29	9.49	10.31	....	8.43	8.52	9.21	....	8.94	8.90	9.87
San Francisco	9.05	10.40	10.90	53.45	9.05	9.15	12.55	15.60	9.15	9.30	11.55
Seattle	9.55	10.70	11.65	55.20	9.55	9.80	13.40	15.85	9.35	9.30	11.70
Spokane, Wash.	9.55	10.70	11.65	....	9.55	9.80	13.40	16.60	9.35	9.30	11.70
Washington	8.46	9.58	....	....	9.06	9.13	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; §42 in. and under; **¼-in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—400 to 999 lb; [6]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beach Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles O., $138; Cutler, Utah, $165.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $150; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; E. Chicago, Ind., $187; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $100; Clearfield, Pa., Portsmouth, O., $102.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Pa., Orviston, Pa., $305.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Pa., Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ¼-in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝-in. grains with fines: Baltimore, $72.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $32-$34; Mexican, all-rail, duty paid, $27-$27.75; barge, Brownsville, Tex., $27.75-$29.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.55
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	35.00-36.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$24.00-26.00
Domestic, concentrates, mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-$1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$54.00-57.00
48% 2.8:1	51.00-54.00
48% no ratio	43.00-45.00

South African Transvaal

48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00

Turkish

48% 3:1	$60.00-63.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked $1.15

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.20-3.65
60-65%	3.60-3.80

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron:	
Swedish, c.i.f. Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b., Riverton, N. J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	26.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 99.00-290.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb drum, frght allowed	
Carlots	38.20
Ton lots	40.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	35.80-45.00†
Bronze, 5000-lb lots	44.70-59.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.065
Nickel-Silver, 5000-lb lots	54.70-66.40†
Phosphor-Copper, 5000-lb lots	64.00
Copper (atomized) 5000-lb lots	46.50-54.00‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.08
Stainless Steel, 316	$1.44
Tin	14.50*
Zinc, 5000-lb lots	19.75-33.00‡
Tungsten:	Dollars
Melting grade, 99%	
60 to 2000 mesh:	
1000 lb and over	4.00
Less than 1000 lb	4.15
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam.	Inches Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5¼	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.75-15.75
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	33.78
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens	
New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	29.27
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.14
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.80 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.15	$7.15	$7.15	$7.40
Bar Size Angles	7.11	7.11	7.11	7.26
Structural Angles	7.30	7.30	7.30	7.60
I-Beams	7.50	7.50	7.50	7.75
Channels	7.70	7.70	7.70	7.95
Plates (basic bessemer)	9.00	9.00	9.00	9.30
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	27.17	27.17	27.17	27.64
Barbed Wire (†)	6.90	6.90	6.90	7.35
Merchant Bars	7.15	7.15	7.15	7.50
Hot-Rolled Bands	7.25	7.25	7.25	7.65
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails (‡)	8.45	8.45	8.45	8.57
Oil Country Pipe: Mills withdrawn temporarily.				

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

Spot, cents per gallon, ovens

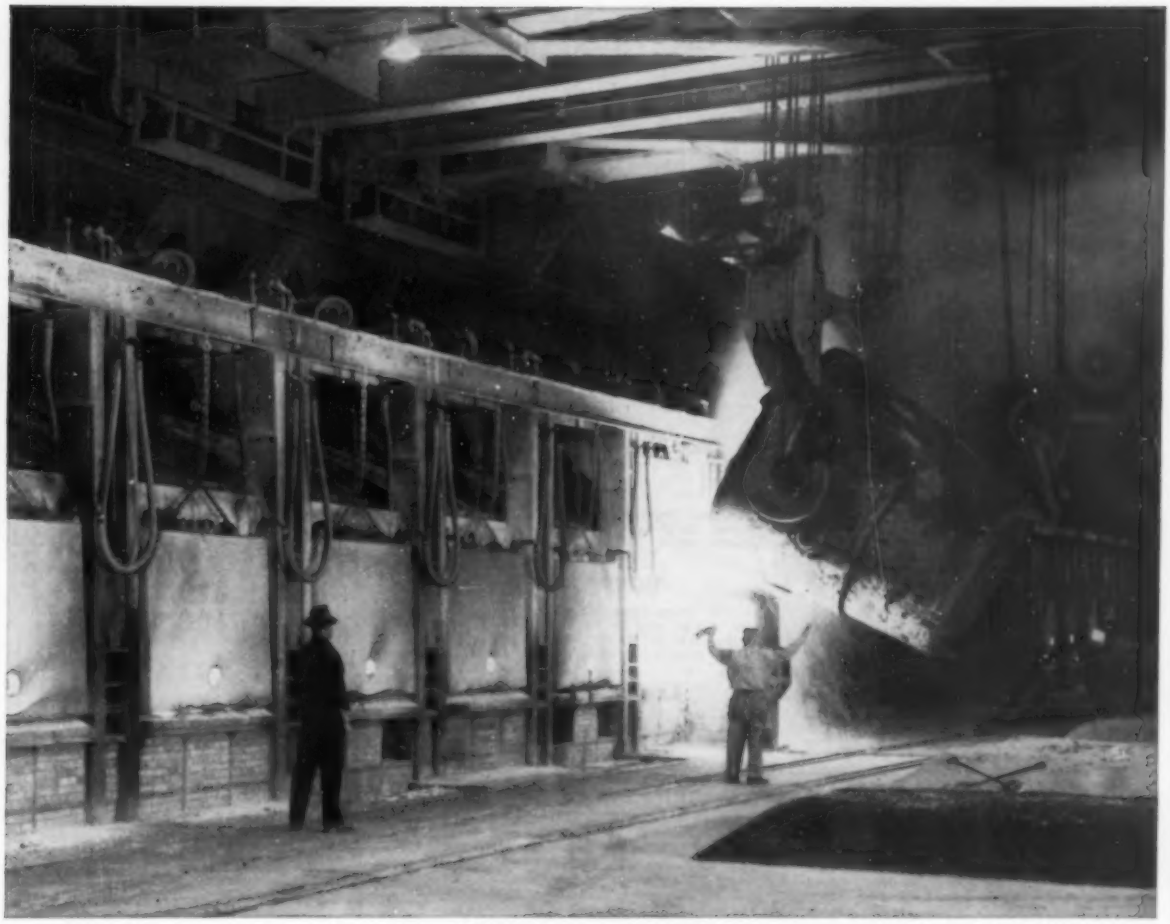
Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.



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Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton: $225, Johnstown, Duquesne, Sheridan, Pa., Alloy W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Grade Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 33c; 2000 lb to min carload, 35c; 500 lb to 1999 lb, 37c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk, 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 29.05c per lb contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 20.85c, per lb of alloy, ton lot 22.10c; less ton lots 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13c per lb of contained Si. Packed c.l. 15.5c, ton lot 16.95c, less ton 18.6c, f.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices. **65% Ferrosilicon:** Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot, 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5%-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carload 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.
Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Contract, carload, bulk, 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c, less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk, 7.7c per lb of briquet, packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $5.10 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $5.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, c.l. packed ⅛-in. x 12 M 19c per lb of alloy, ton lot 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5.7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

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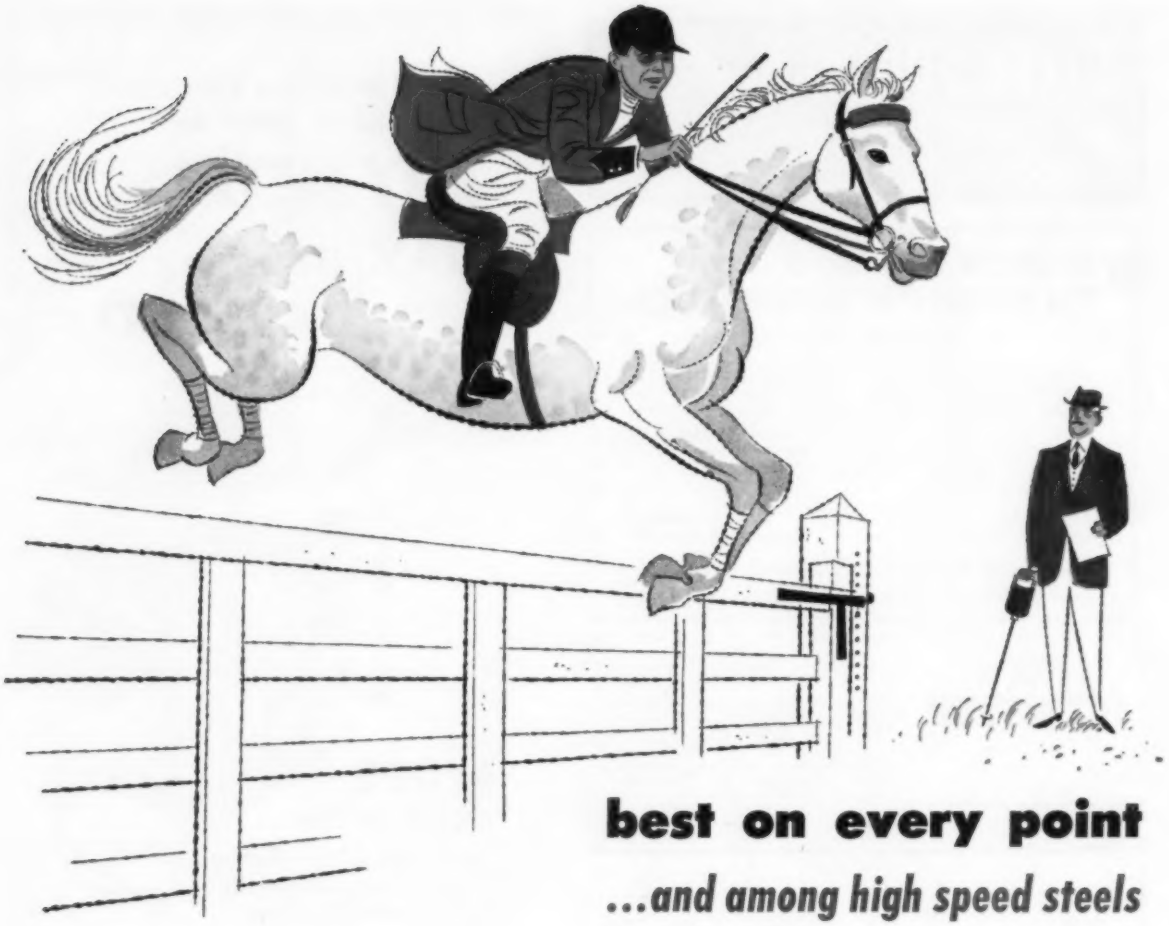

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Scrap Still Falling as Buying Lags

STEEL's index on the steelmaking grades declines to $42.67, down $1.33. Mill purchases are limited with the ingot operating rate continuing to slip

Scrap Prices, Page 146

Pittsburgh—A large Pittsburgh mill bought No. 1 heavy melting for $42, No. 2 heavy melting for $37 and No. 2 bundles for $35 last week. The purchase narrowed the unusually wide spread between No. 1 and No. 2 heavy melting prices, lowering the former by $1 and increasing the latter by $2. No. 2 bundles sold for $2 a ton more than the previous quotation. Brokers think the drop in No. 1 heavy melting has halted, at least temporarily. Railroad grades attracted slightly higher prices on most recent lists, a sign of growing strength. Most prices went up $1 to $2.

Chicago—Activity in scrap buying is extremely light, but there is some indication that the market is stabilizing. Price fluctuations the past week have been limited to a few steelmaking grades. Mills have good inventories of scrap, and steelmaking operations continue to shrink moderately. The rate is hovering around 90 per cent of capacity. Foundries also are running on reduced melting schedules with no prospects of early pickup.

Philadelphia—No. 1 heavy melting steel scrap has been purchased for the Fairless Works at $46, off $2.50 a ton. No. 2 grades of steel scrap are $1 lower at $38 for No. 2 heavy melting and $36 for No. 2 bundles. Railroad scrap and rail crops are also off $1.

With two cargoes being bought for export, prices paid for dock delivery are somewhat higher than those for domestic shipment. No. 2 bundles are $34, which for yard delivery is higher considering broker and other charges.

Birmingham — Inventories at area steel mills and foundries are substantial. Purchases by most consumers are limited. Lack of demand is reflected in a steady decline in prices, which, according to dealers, now are at unprofitable levels.

There is a good demand on export account. Most of the scrap moving in this market is from the coastal areas.

Moderate activity in the electric furnace and cast iron grades is noted.

Washington — Consumption of ferrous materials (scrap and pig iron) in February declined 9 per cent from that of the preceding month, reports the U.S. Bureau of Mines. The daily rate of consumption was up slightly because of fewer working days in the month.

The total melt (11,913,000 gross tons) consisted of 50.7 per cent scrap (6,043,000 tons), and 49.3 per cent pig iron (5,870,000 tons). This compared with 50.6 per cent scrap and 49.4 per cent pig iron in January.

Scrap available for consumption in the month (home production plus purchases) amounted to 6,020,000 tons, off about 8 per cent from January. Home scrap accounted for 3,343,000 tons, purchased, 2,677,000. Of the purchased material, 84 per cent was received from dealers and 16 per cent from other sources.

Domestic stocks of ferrous scrap held by consumers at the end of February were 6,520,000 gross tons. This compared with 6,528,135 at the end of January. Stocks of pig iron totaled 2,002,000 tons against 2,024,625. Comparative data follow:

COMPARATIVE SCRAP, PIG IRON DATA
(Gross tons)

Month	Scrap Available for consumption		Consumption		Consumers' Stocks at end of month	
	Home	Purchased	Scrap	Pig Iron	Scrap	Pig Iron
February, 1957	3,343,000	2,677,000	6,043,000	5,870,000	6,520,000	2,002,000
January, 1957	3,633,578	2,902,380	6,630,804	6,482,472	6,528,135	2,024,625
December, 1956	3,544,277	3,129,806	6,264,955	6,396,468	6,621,478	2,102,496
November, 1956	3,518,533	2,827,563	6,305,947	6,237,538	6,212,242	2,060,879
October, 1956	3,716,308	3,126,537	6,722,320	6,450,404	6,181,076	2,124,841
September, 1956	3,352,589	2,658,911	6,231,017	6,053,147	6,059,165	2,139,236

Cleveland—A small purchase of No. 1 heavy melting steel at $39 by a local mill pushed the price up about $1.50 a ton on the No. 1 grades here. Valley prices also went up, reflecting a slowing down in the movement of scrap out of the Cleveland market due to the higher-priced local sale. Actually, the market is steady.

New York—Steel scrap prices are stabilizing. Despite a new purchase by the leading eastern Pennsylvania consumer, brokers' buying prices are generally unchanged, with No. 1 heavy melting $42-$43. Export demand tends to hold up prices, with yard supplies not too plentiful. Stainless scrap demand is in excess of supply, but prices are steady and unchanged.

Youngstown — Indecision and rumor dominate in the local scrap market. New orders are absent. Quoted prices are nominal. The low rate of bessemer converter operations will release more hot metal to the open-hearth furnaces, reducing their dependance on scrap.

(*Please turn to page* 152)

● One well-known stove manufacturer wanted to speed-up assembly—a call to Reading Engineers led to complete solution. A 10-ton, double I-Beam, cab-controlled Reading Crane brought even better results than expected.

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Apr. 17, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Apr. 17	$42.67
Apr. 10	44.00
Mar. Avg.	49.63
Apr. 1956	54.90
Apr. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	*36.00-37.00*
No. 1 bundles	*41.00-42.00*
No. 2 bundles	*34.00-35.00*
No. 1 busheling	*41.00-42.00*
Machine shop turnings	*28.00-29.00*
Mixed borings, turnings	*28.00-29.00*
Short shovel turnings	*32.00-33.00*
Cast iron borings	*32.00-33.00*
Cut structurals, 3 ft. lengths	*46.00-47.00*
Cut structurals, 2 ft. and under	*47.00-48.00*
Heavy turnings	*36.00-37.00*
Punchings & plate scrap	*46.00-47.00*
Electric furnace bundles	*46.00-47.00*

Cast Iron Grades

No. 1 cupola	44.00-45.00
Heavy breakable cast	42.00-43.00
Unstripped motor blocks	34.00-35.00
No. 1 machinery cast	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt	*45.00-47.00*
Rails, 2 ft and under	*66.00-67.00*
Rails, 18 in. and under	*67.00-68.00*
Rails, random lengths	*62.00-63.00*
Railroad specialties	*63.00-64.00*

Stainless Steel Scrap

18-8 bundles & solids	330.00-350.00
18-8 turnings	240.00-250.00
430 bundles & solids	85.00-90.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	*38.00-39.00*
No. 1 factory bundles	42.00-43.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	*38.00-39.00*
No. 2 bundles	*32.00-33.00*
No. 1 busheling	*38.00-39.00*
Machine shop turnings	22.00-23.00
Mixed borings, turnings	25.00-26.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut foundry steel	43.00-44.00
Cut structurals, plates 2 ft and under	49.00-50.00
Low phos. punchings & plate	*39.00-40.00*
Alloy free, short shovel turnings	29.00-30.00
Electric furnace bundles	*39.00-40.00*

Cast Iron Grades

No. 1 cupola	48.00-49.00
Charging box cast	37.00-38.00
Heavy breakable cast	37.00-38.00
Stove plate	44.00-45.00
Unstripped motor blocks	30.00-31.00
Brake shoes	37.00-38.00
Clean auto cast	47.00-48.00
Burnt cast	35.00-36.00
Drop broken machinery	50.00-51.00

Railroad Scrap

No. 1 R.R. heavy melt	45.00-46.00
R.R. malleable	53.00-54.00
Rails, 2 ft and under	66.00-67.00
Rails, 18 in. and under	67.00-68.00
Rails, random lengths	61.00-62.00
Cast steel	55.00-56.00
Railroad specialties	59.00-60.00
Uncut tires	58.00-59.00
Angles, splice bars	59.00-60.00
Rails, rerolling	67.00-68.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	*310.00-320.00*
18-8 turnings	*210.00-220.00*
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	35.50-36.50
No. 1 bundles	*41.00-42.00*
No. 2 bundles	33.00-34.00
No. 1 busheling	*41.00-42.00*
Machine shop turnings	22.00-23.00
Short shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Low phos.	*42.00-43.00*
Electric furnace bundles	*42.00-43.00*

Railroad Scrap

No. 1 R.R. heavy melt	46.00-47.00

CHICAGO

No. 1 hvy melt, indus	*41.00-42.00*
No. 1 hvy melt, dealer	39.00-40.00
No. 2 heavy melting	35.00-36.00
No. 1 factory bundles	*44.00-45.00*
No. 1 dealer bundles	*40.00-41.00*
No. 2 bundles	*32.00-33.00*
No. 1 busheling, indus	*41.00-42.00*
No. 1 busheling, dealer	39.00-40.00
Machine shop turnings	23.00-24.00
Mixed borings, turnings	25.00-26.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut structurals, 3 ft	*46.00-47.00*
Punchings & plate scrap	*47.00-48.00*

Cast Iron Grades

No. 1 cupola	39.00-40.00
Stove plate	34.00-35.00
Unstripped motor blocks	29.00-30.00
Clean auto cast	44.00-45.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt	46.00-47.00
R.R. malleable	53.00-54.00
Rails, 2 ft and under	56.00-57.00
Rails, 18 in. and under	57.00-58.00
Angles, splice bars	53.00-54.00
Rails, rerolling	*56.00-57.00*

Stainless Steel Scrap

18-8 bundles & solids	330.00-340.00
18-8 turnings	230.00-240.00
430 bundles & solids	*75.00-80.00*
430 turnings	50.00-55.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	35.00-36.00
No. 2 bundles	24.00-25.00
No. 1 busheling	33.00-34.00
Machine shop turnings	22.00-23.00
Mixed borings, turnings	23.00-24.00
Short shovel turnings	23.00-24.00
Punchings & plate scrap	40.00-41.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	41.00
Stove plate	43.00
Heavy breakable	39.00
Unstripped motor blocks	26.00
Clean auto cast	51.00
Malleable	53.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	39.50
No. 2 heavy melting	37.00
No. 1 bundles	39.50
No. 2 bundles	32.00
No. 1 busheling	39.50
Machine shop turnings	24.00
Short shovel turnings	29.00

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	35.00
Heavy breakable cast	35.00
Unstripped motor blocks	35.00
Brake shoes	40.00
Clean auto cast	48.00
Stove plate	39.00

Railroad Scrap

No. 1 R.R. heavy melt	46.50
Rails, 18 in. and under	59.00
Rails, rerolling	58.00
Rails, random lengths	51.00
Angles, splice bars	53.00

PHILADELPHIA

No. 1 heavy melting	*46.00*
No. 2 heavy melting	*38.00*
No. 1 bundles	*46.00*
No. 2 bundles	*36.00*
No. 1 busheling	*46.00*
Electric furnace bundles	51.00
Mixed borings, turnings	35.00
Short shovel turnings	36.00-37.00
Machine shop turnings	33.00-34.00
Heavy turings	*42.00*
Structurals & plate	*51.00-53.00*
Couplers, springs, wheels	*58.00-59.00*
Rail crops, 2 ft & under	*65.00-66.00*

Cast Iron Grades

No. 1 cupola	43.00-44.00
Heavy breakable cast	*54.00-55.00*
Malleable	62.00
Drop broken machinery	55.00-56.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	42.00-43.00
No. 2 bundles	30.00-31.00
Machine shop turnings	22.00-23.00
Mixed borings, turnings	24.00-25.00
Short shovel turnings	27.00-28.00
Low phos. (structurals & plate)	46.00-47.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Unstripped motor blocks	31.00-32.00
Heavy breakable	45.00-46.00

Stainless Steel

18-8 sheets, clips solids	360.00-370.00
18-8 borings, turnings	260.00
430 sheets, clips, solids	80.00-90.00
410 sheets, clips, solids	70.00-80.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	36.50-37.00
No. 2 heavy melting	30.50-31.00
No. 1 bundles	37.00-37.50
No. 2 bundles	28.50-29.00
No. 1 busheling	36.50-37.00
Machine shop turnings	20.50-21.00
Mixed borings, turnings	23.00-24.00
Short shovel turnings	24.00-25.00
No. 1 cast	38.00-39.00
Mixed cupola cast	36.00-37.00
No. 1 machinery cast	44.00-45.00

BUFFALO

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	37.00-38.00
No. 1 bundles	41.00-42.00
No. 2 bundles	34.00-35.00
No. 1 busheling	41.00-42.00
Mixed borings, turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Short shovel turnings	30.00-31.00
Cast iron borings	29.00-30.00
Low phos.	45.00-46.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*41.00-42.00*
No. 1 machinery	*46.00-47.00*

Railroad Scrap

Rails, random lengths	53.00-54.00
Rails, 3 ft and under	59.00-60.00
Railroad specialties	47.00-48.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	37.00-38.00
No. 2 bundles	28.00-29.00
No. 1 busheling	37.00-38.00
Machine shop turnings	25.00-26.00
Mixed borings, turnings	25.00-26.00
Short shovel turnings	27.00-28.00
Cast iron borings	23.00-24.00
Low phos. 18 in.	48.00-49.00

Cast Iron Grades

No. 1 cupola	*44.00-45.00*
Heavy breakable cast	43.00-44.00
Charging box cast	43.00-44.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt	*41.00-42.00*
Rails, 18 in. and under	64.00-65.00
Rails, random lengths	54.00-55.00

BIRMINGHAM

No. 1 heavy melting	40.00-41.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	40.00-41.00
No. 2 bundles	*23.00-24.00*
No. 1 busheling	40.00-41.00
Cast iron borings	26.00-27.00
Short shovel turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Bar crops and plate	46.00-47.00
Structurals & plate	45.00-46.00
Electric furnace bundles	43.00-44.00
Electric furnace, 2 ft & under	41.00-42.00

(F.o.b. shipping point)

Cast Iron Grades

No. 1 cupola	48.00-49.00
Stove plate	47.00-48.00
Unstripped motor blocks	38.00-39.00
Charging box cast	37.00-38.00
No. 1 wheels	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt	*39.00-40.00*
Rails, 18 in. and under	53.00-54.00
Rails, rerolling	59.00-60.00
Rails, random lengths	*48.00-49.00*
Angles, splice bars	52.00-53.00

SEATTLE

No. 1 heavy melting	*48.00*
No. 2 heavy melting	*45.00*
No. 1 bundles	*45.00*
No. 2 bundles	*28.00-30.00*
Machine shop turnings	33.00-35.00
Mixed borings, turnings	33.00-35.00
Electric furnace No. 1	62.00

Cast Iron Grades

No. 1 cupola	50.00
Heavy breakable cast	48.00
Unstripped motor blocks	40.00
Stove plate (f.o.b. plant	42.00

LOS ANGELES

No. 1 heavy melting	55.00
No. 2 heavy melting	51.00
No. 1 bundles	54.00
No. 2 bundles	34.00
Machine shop turnings	36.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	60.00

SAN FRANCISCO

No. 1 heavy melting	51.00
No. 2 heavy melting	46.00
No. 1 bundles	50.00
No. 2 bundles	38.00
Machine shop turnings	35.00
Mixed borings, turnings	35.00
Cast iron borings	35.00
Heavy turnings	35.00
Short shovel turnings	37.00
Cut structurals, 3 ft	63.00

Cast Iron Grades

No. 1 cupola	57.00
Charging box cast	47.00-49.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	57.00
No. 1 wheels	50.00
Drop broken machinery	57.00

HAMILTON, ONT.

No. 1 heavy melting	43.00
No. 2 heavy melting	38.00
No. 1 bundles	43.00
No. 2 bundles	32.00
Mixed steel scrap	35.00
Mixed borings, turnings	19.00
Busheling, new factory: Prepared	43.00
Unprepared	37.00
Short steel turnings	30.00
Rails, rerolling	49.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.

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Aluminum Supply Plentiful

Primary producers hope to keep away from stockpiling. With the help of "put right" provisions, the industry plans to hang on until new applications absorb additional production

Nonferrous Metal Prices, Pages 150 & 151

THE ALUMINUM industry estimates there will be an excess of 200,000 to 250,000 tons of the lightweight metal during 1957.

But the aluminum producers' Industry Advisory Committee has recommended against the reinstatement of stockpiling by the government during the second half.

Why — Please-do-not-quote sources reveal the reasons: 1. Stockpile purchases are usually under the market price. 2. Part of the excesses being generated this year can be sold to the government at market price under the "put right" provisions of the Defense Production Act. 3. During 1954, stockpiling was started as markets softened. When demand jumped in 1955, producers had to continue to deliver to U.S. coffers and fight red tape to get deferred deliveries. The government even had the right to tell primary producers who should get the deferred aluminum. 4. The industry is confident that new breakthroughs in transportation and building will soon absorb the overflow.

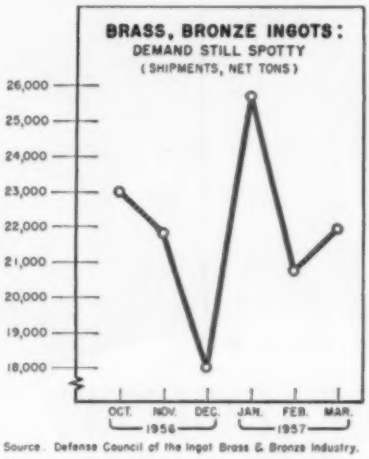
Put Right—A General Services Administration spokesman reveals that since December, 192,500 tons of aluminum have been "put" to the government.

The box score:

Alcoa	125,000 tons
Kaiser	35,000 tons
Reynolds	32,500 tons
Total	192,500 tons

During the Korean War, some 1.6 million tons of new aluminum capacity was started. The aluminum companies can only ask the government to purchase that portion which was requested for defense needs. The "put" clause will draw to a close in late 1958, expiring at the same time as the five-year rapid amortization program. Harvey Aluminum Co. has a put right arrangement but can't use it until it brings in its initial production of some 67,000 tons.

Washington Scene—Top brass in the aluminum industry is reportedly making initial inquiries about extending the put right provision. Results: Requests are falling on deaf ears so far.



Source: Defense Council of the Ingot Brass & Bronze Industry.

Copper Strike Ends

It took just ten days to settle the strike at Kennecott Copper Corp.'s Chilean facility. Food for thought: Copper miners are not interested in a prolonged strike when the market is showing soft spots. While workers demanded a 40 per cent pay raise, they settled for much less.

Wire and cable makers continue to keep the market buoyed. Brass mills are building order books slowly, showing minor daily gains.

Outlook: Primary price could dip to 30 cents during the next two or three months if automotive production is cut back or the summer slack period is more severe than last year's.

Tungsten Gains Backers

Pleas for government help to keep tungsten mines open may be getting a listen from military officials. The case is stated like this: With the highest melting point of any metal (6152°F), tungsten provides a steel alloy that withstands high temperatures and speed in cutting tools and jet engine parts. Alloyed with carbon (tungsten carbide), it makes the hardest of all fabricated materials except the manmade industrial diamond. Military experts may agree fully with tungsten producers before the year is out.

Lead, Zinc Sales So-So

Lead and zinc sales are moderate. Government take for stockpile is keeping both metals at current prices. There could be the possibility of a price drop in zinc if summer doldrums hit orders. Automotive holds the key to better zinc sales. Diecasters are still ordering minimum tonnages. The lead market is somewhat better.

NONFERROUS PRICE RECORD

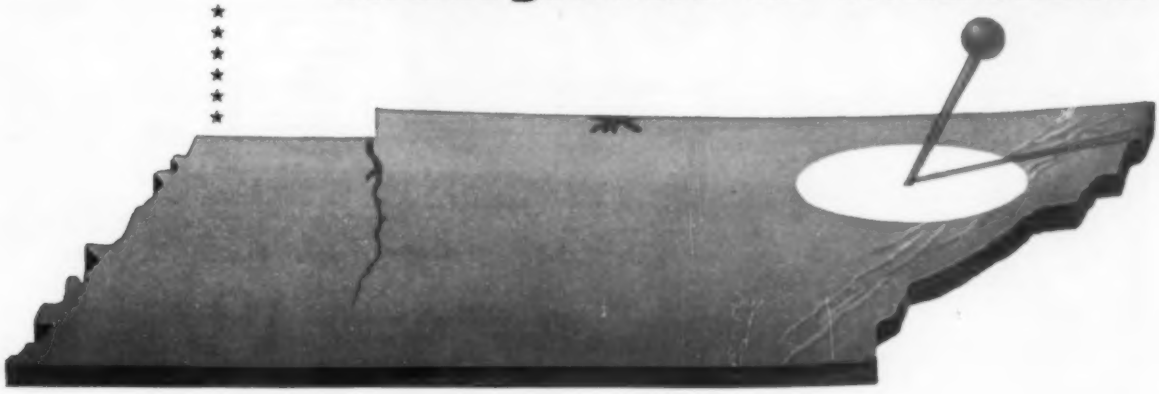
	Price Apr. 17	Last Change	Previous Price	Mar. Avg.	Feb. Avg.	Apr., 1956 Avg.
Aluminum	27.10	Aug. 10, 1956	25.90	27.100	27.100	24.650
Copper	31.00–32.00	Apr. 13, 1957	31.50–32.00	31.462	32.863	47.500
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	15.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	33.150
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	64.500
Tin	100.00	Apr. 15, 1957	99.625	99.683	101.159	99.270
Zinc	13.50	Jan. 6, 1956	13.50	13.500	13.500	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

We've discovered

PART OF AMERICA'S FUTURE

underground in Tennessee



As the American economy has expanded, the use of zinc by industry has greatly accelerated, until today's per capita consumption of zinc shows a giant 24% increase over the per capita consumption only seven years ago.

But what about the future? With zinc's importance to Industry's ever-increasing demands, what about the supply?

In recent months, American Zinc has discovered a part of America's industrial future... underground in Tennessee. In the East Tennessee area, mining properties which adjoin American Zinc's long-established Mascot, Tenn., mining operations, exploration and development have confirmed zinc ore reserves underground which are equivalent to *more than 75 years' production at the current rate* of mines now operating in this area.

Tomorrow's zinc for automobile grills and trim... the galvanized coatings for steel... zinc for die-castings and brass... zinc pigments for paints and rubber... now lies underground in American Zinc's Tennessee development.

American Zinc, lead & smelting company

Columbus, Ohio · Chicago · St. Louis · New York · Detroit · Pittsburgh

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 241, 30.50; No. 356, 28.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.
Cobalt: 97-99%, $2.35 per lb for 550-lb keg; $2.37 per lb for 100-lb case; $2.42 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 32.00 deld. Conn. valley; 32.00 deld. Midwest; custom smelters, 31.00 deld.; lake, 32.00 deld.; fire refined, 31.75 deld.

Germanium: First reduction $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis, New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.
Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01.
Osmium: $80-$100 per troy oz, nom.
Palladium: $23-$24 per troy oz.

Platinum: $92-$95 per troy oz from refineries.
Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $12-$15 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.65 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N.Y., spot and prompt, 100.00.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.75; grade A-2 (0.5% Fe max.), $2.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.00 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.75.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 14.85; special high grade, 15.25 deld. Die casting alloy ingot No. 3, 17.50; No. 2, 18.50; No. 5, 18.00 deld.
Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.75-28.75; No. 12 foundry alloy (No. 2 grade), 21.50-22.50; 5% silicon alloy, 0.60 Cu max., 24.25-25.00; 13 alloy, 0.60 Cu max., 24.25-25.00; 195 alloy, 24.00-25.25; 108 alloy, 22.00-22.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.25; grade 2, 21.50; grade 3, 20.50; grade 4, 19.75.
Brass Ingot: Red brass, No. 115, 31.50; tin bronze, No. 225, 40.50; No. 245, 35.50; high-leaded tin bronze, No. 305, 35.50; No. 1 yellow, No. 405, 25.25; manganese bronze, No. 421, 28.50.
Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.83-$1.86, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 37.355; l.c.l., 37.98. Weatherproof, 30,000-lb lots, 37.78; l.c.l., 38.53. Magnet wire deld., 15,000 lb or more, 44.68; l.c.l., 45.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $11.00-$14.75; sheared mill plate, $9.25-$11.25; wire, $8.50-$11.00; forging billets, $6.85-$7.10; hot-rolled and forged bars, $7.10-$7.35.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	260

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.135	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.035	43.90-55.60	38.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.50-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.59	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. width or diam., 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-Finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.0750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.10-44.60	57.80-61.80
12-14	43.40-44.80	58.40-62.70
15-17	43.60-45.40	59.60-64.30
18-20	44.10-45.80	61.50-66.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.99. AZ31B spec. grade, .032 in., 171.30; .081 in., 106.70; .125 in., 98.10; .188 in., 95.70; .250-2.0 in., 93.30. Thread plate, .188 in., 71.70; .250-2.0 in., 70.60. Tooling plate, .250-3.0 in., 73.0.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.50-14.00; old sheets, 10.00-10.50; borings and turnings, 6.50-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	54.32	28.000	28.000	27.250
Yellow Brass	47.52	35.69d	48.06	50.43	21.875	21.625	20.125
Low Brass, 80%	50.20	50.14	50.74	53.01	24.250	24.000	23.500
Red Brass, 85%	51.14	51.06	51.06	53.95	25.000	24.750	24.250
Com. Bronze, 90%	52.63	52.57	53.17	55.19	25.875	25.625	25.125
Manganese Bronze	55.43	49.53	59.77	....	20.500	20.250	19.750
Munts Metal	49.79	45.60	....	....	20.750	20.500	20.000
Naval Brass	51.69	46.00	58.75	55.10	20.500	20.250	19.750
Silicon Bronze	58.60	57.79	58.64	60.68e	27.375	27.125	26.375
Nickel Silver, 10%	64.06	66.39g	66.39	....	28.250	28.000	14.125
Phos. Bronze, A-5%	73.17	73.67	73.67	74.85	28.875	28.625	27.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

7.60; crankcases, 10.60-10.50; industrial castings, 10.00-10.50.

Copper and Brass: No. 1 heavy copper and wire, 24.25-24.50; No. 2 heavy copper and wire, 22.75-23.75; light copper, 20.50-20.75; No. 1 composition red brass, 21.00-21.50; No. 1 composition turnings, 20.50-21.00; yellow brass turnings, 12.00-12.75; new brass clippings, 19.00-19.50; light brass, 12.00-12.50; heavy yellow brass, 14.50-15.00; new brass rod ends, 16.50-17.00; auto radiators, unsweated, 15.50-16.00; cocks and faucets, 16.50-17.00; brass pipe, 17.00-17.50.

Lead: Heavy, 12.00-12.50; battery plates, 6.25-6.75; linotype and stereotype, 13.00-14.00; electrotype, 12.50-13.00; mixed babbitt, 12.00-13.50.

Monel: Clippings, 50.00-55.00; old sheets, 50.00-55.00; turnings, 45.00-50.00; rods, 50.00-55.00.

Nickel: Sheets and clips, 100.00-125.00; rolled anodes, 100.00-125.00; turnings, 80.00-115.00; rod ends, 100.00-125.00.

Zinc: Old zinc, 4.50-5.00; new die-cast scrap, 3.75-4.00; old die-cast scrap, 2.25-2.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 17.00-17.50; 3003 clippings, 17.00-17.50; 6151 clippings, 17.00-17.50; 5052 clippings, 17.00; 2014 clippings, 16.00-17.00; 2017 clippings, 16.00-17.00; 2024 clippings, 16.00-17.00; mixed clippings, 16.00; old sheets, 14.00; old cast, 14.00; clean old cable (free of steel), 16.50-17.00; borings and turnings, 14.50-15.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 34.00.

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 25.25; light copper, 23.00; refinery brass (60% copper) per dry copper content, 24.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 25.25; light copper, 23.00; No. 1 composition borings, 23.00; No. 1 composition solids, 23.50; heavy yellow brass solids, 17.50; yellow brass turnings, 16.50; radiators, 18.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 50.29; oval, 49.42, 5000-10,000 lb; electrodeposited, 39.25, 2000-5000 lb lots; cast, 44.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab; less than 200 lb, 118.50; 200-499 lb, 117.00; 500-999 lb, 116.50; 1000 lb or more, 116.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.
Chromic Acid: 100 lb, 33.20; 500 lb, 32.70; 2000 lb, 32.05; 5000 lb, 31.75; 10,000 lb, 31.25, f.o.b. Detroit.

Copper Cyanide: 100-1000 lb, 77.50.

Copper Sulphate: 100 lb, 26.65; 200 lb, 23.65; 300 lb, 22.65; 400 lb, 22.15; 500 lb, 20.65; 2000 lb, 18.40; 6000 lb, 18.15; 12,000 lb, 17.90, f.o.b. shipping point.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400 lb, 43.50; 5000 lb, 41.50; 10,000 lb, 40.50.

Nickel Sulphate: 100 lb, 40.50; 200 lb, 38.50; 300 lb, 37.50; 400 lb, 35.50; 5000 lb, 33.50; 20,000 lb, 33.00; 36,000 lb, 32.50.

Sodium Cyanide: 100 lb, 27.50; 200 lb, 25.80; 400 lb, 22.80; 1000 lb, 21.80, f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 78.50; 100-600 lb, 69.20; 700-1900 lb, 66. 40; 2000-9900 lb, 64.60; 10,000 lb or more, 63.30.

Stannous Chloride (anhydrous): Less than 25 lb, 168.30; 25 lb, 133.30; 100 lb, 118.30; 400 lb, 115.90; 5200-19,600 lb, 103.70; 20,000 lb or more, 91.50.

Stannous Sulphate: Less than 50 lb, 131.00; 50 lb, 101.00; 100-1900 lb, 99.00; 2000 lb or more, 97.00.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

KEYSTONE XL COLD HEADING WIRE

282% MATERIAL SAVED...

USING KEYSTONE XL COLD HEADING WIRE

This circuit breaker part was machined at one time. But, cold-heading experts analyzed its design and decided that it could be successfully formed from Keystone "XL" Cold Heading Wire. The result—a material waste reduction from 75% to 7%—and a saving of 282% in steel, plus faster, lower cost production and a finished product that is stronger and free from defects.

Keystone "XL" Cold Heading Wire is not just ordinary cold heading wire. It is wire made to your specific order to exactly solve your difficult cold heading problems. Special drawing, annealing and coating "secrets" produce a wire of exceptional *flowability*. Originally developed for recessed head screws, Keystone "XL" Wire is now widely used to solve many of the toughest cold heading problems at great savings in time and money.

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KEYSTONE STEEL & WIRE COMPANY, PEORIA 7, ILLINOIS

KEYSTONE WIRE *for Industry*

PUMPS

AT SACRIFICE PRICES!

1—**INGERSOLL RAND** Cameron Pump, Serial No. 03483210, No Motor, Year Mfg. 1948.

1—**INGERSOLL RAND** Cameron Centrifugal Pump & Motor, Model No. E3-EV, Serial No. A433286, with 100 HP Induction Motor: Model 17470, 3 phase, 60 cycle, 440 volts, 1755 RPM. Pump: G.P.M 450, 1750 RPM, 462' Head, including 100 HP. Electrical: G.E. Automatic Compensator CR-7051 K1, 3 phase, 60 cycle, 440 volts. Year Mfg. 1943.

1—**INGERSOLL RAND** Cameron Pump & Motor. Size 4HMT-4, Serial No. 01443518, 100 HP G.E. Motor, 440 volts, Type KT-114A, #5168695, Form EL, 40 degrees, Model 17470. Pump: 450 GPM, 539' Head, Hydro Test 1200, 1750 RPM. Electrical: G.E. Automatic Compensator CR-7051 K1, 3 phase, 60 cycle, 440 volts.

1—**INGERSOLL RAND** Cameron Single Stage Suction Centrifugal Pump, Size 4RT-4, Serial No. 04523068, 200 HP Reliance Motor, 3550 RPM, 440 volts, Form O, #Y71344A1, 239A, Code G, Frame A-50586, 40 degrees. Pump: 450 GPM, 3560 RPM, 1100' Head, 1200 Hydro Test, Year Mfg. 1952. Electrical: G.E. 151-200 HP Automatic Compensator, 3 phase, 60 cycle, 440 volt, CR-7051, Dif with Enclosure 8B max. Amps 600.

1—**WORTHINGTON** Pump, Style 5KF365-DA7, Serial No. 1038687, Size 1¾ x 4, 30GPM, 1200 lb. capacity, 25 HP G.E. Motor, #5334, 1760 RPM. TEPC, 220/440, 260 RPM, #5584203, Type KF, Model 14W168M44, Year Mfg. 1941.

1—**ALLIS CHALMERS** Centrifugal Pump, 3 or 4 stage, 4" inlet, 3" outlet, 500 lb. pressure, 150 GPM, new element, unit direct coupled to 75 HP Crocker Wheeler totally enclosed fan cooled Motor for 3/60/220, 3600 RPM, mounted on Base, with Skidmore primer, equipped with Cutler-Hammer Bullet #9105, 75 HP Cross-The-Line Starter.

1—**ALLEN SHERMAN HOFF** Hydro Seal Pump, Style 5K326B76, Serial No. HW-18997, 15 HP G.E. Motor, 220/440 volts, 1750 RPM. Year Mfg. 1941.

SEE AMERICA'S Largest Foundry Equipment Dealer FIRST!

AAA MACHINERY & EQUIPMENT CO.
15539 Saranac Rd., CLEVELAND 10, O.
Phone: Liberty 1-6545

2000 Ton Hydraulic Press, Watson-Stillman 60" side to side, 46" F to B, 36" Daylight, 18" stroke, 36" diameter ram for 4000 PSI, complete with self-contained hydraulic system. Modern late model, excellent condition. Bargain Priced.

Bedford-Bolling Company, Inc.
MIchigan 1-2850
3190 East 65th Street Cleveland 27, Ohio

The following steel is available for immediate sale. Terms cash, subject to prior sale. This material is attractively priced.

40 tons, 1-3/16" diameter, FS4140 cold rolled steel normalized, 12' random lengths.

80 tons, 1⅞" diameter, FS4140 cold rolled steel annealed, 12' random lengths.

This material is in good clean condition and bundled ready for shipment. Our asking price for each complete item is $175.00 per ton, f.o.b. our plant Detroit, Michigan.

Please address your inquiries to the attention of Mr. George Clayton, Purchasing Agent,

Bonney Forge & Tool Works,
Alliance, Ohio

MODERN FORGING MACHINES

2", 3", 4" & 5" AJAX & NATIONAL Air Clutch and Air Brake, Motor & Control with Furnaces.

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1330 No. 5th St.
Philadelphia, Pa. ST 4-8911

FOR SALE
IMMEDIATE DISPOSAL

OVERHEAD BRIDGE CRANES
All 3-motor, cab operated, 230 volt DC.
1—15 ton, P & H, 71'-10" Span.
1—15 Ton, P & H, 48'-9" Span.
1—10 Ton, P & H, 38'-9" Span.

DIESEL GENERATORS
2—200 KW F.M., 300 H.P., 257 RPM, 240 volt.
1—200 KW Worthington, 300 H.P., 400 RPM, 240 volt.

Miscellaneous
1—72" x 52'-4" Niles lathe, 2-carriage, 50 H.P. motor, rapid traverse.

CONSOLIDATED PRODUCTS CO., INC.
52-54 Bloomfield St. Hoboken, N. J.
OL. 9-4425 N.Y. Tel: BA. 7-0600

WANTED IMMEDIATELY

First class Structural Engineer wanted for large fabricating plant in the Southwest, fabricating steel for mill and tier buildings and all types of highway, turnpike and expressway projects.

Applicant should be about 35-40 years old with about 15 years experience in detail drafting office. Requirements of college graduate or registered engineer are not essential provided applicant has sufficient education and experience to qualify as a registered engineer.

Excellent opportunity for advancement—Ideal working conditions in air-conditioned office—Company benefits—Insurance—Hospitalization — Vacation — Retirement — Paid Holidays and Sick Leave.

Enclose complete resume of personal history, education and experience.

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Penton Bldg. Cleveland 13, Ohio

INDUSTRIAL ENGINEER

Progressive Company engaged in basic process and pyrometallurgy offers unusual opportunity for industrial engineer, preferably having experience in steel or other heavy industry. Must be capable of establishing and administering job evaluation program. Experience in time and motion study as well as material handling desirable. Location northeast section of United States. Position will require some travel to midwest and southern plants. All replies held strictly confidential. Submit detailed resume covering educational background, experience and salary requirements to Box 534, STEEL, Penton Bldg., Cleveland 13, Ohio.

(*Concluded from page* 145)

Buffalo—Prices are fairly stable in the local scrap market because of limited supplies. There is little consumer buying. Mill inventories are being depended upon. One district steel mill is closed by a strike. Another is out of the scrap market entirely. Another mill, the largest in the area, has reduced its scrap intake for April. Cast grades are off a bit, with cupola at $44, down $2, and machinery cast at $47, off $1.

Cincinnati — The major steelmaking grades of scrap are stabilizing, following the recent sharp price drop. No. 1 heavy melting is quoted at $37-$38, brokers' buying price. No new buying is reported, but the trade is confident the market is about on bottom.

Los Angeles—Further price reductions are anticipated, perhaps as much as $2 a ton. Mills hold inventories sufficient to meet requirements for several months.

San Francisco—The scrap market continues weak. Mill purchases are limited. One large steelmaker has cut ingot production to 85 per cent of capacity. This compares with its recent high rate of 115.

Seattle—Weakness continues in the scrap market with another drop of $2 a ton being reported on the steel grades. No. 1 heavy melting is quoted at $48, and No. 2 heavy melting, $45. Major consumers hold substantial inventories and are in position to defer buying. Receipts continue heavy. Export interests are still active. Japan's reported shortage of funds is regarded as temporary. Renewed buying is expected.

CLASSIFIED

Help Wanted

SUPERVISOR WANTED BY MERCHANT BAR Rolling Mill for Finishing and Shipping Department. Small community, location Western Pennsylvania. Experience preferred in Shearing, Straightening, Reinforcing Bar Fabrication and Shipping procedures. Submit full resume of personal history and work experience. Reply to Box 544, STEEL, Penton Bldg., Cleveland 13, Ohio.

A RELIABLE ENGINEERING FIRM REQUIRES the services of a project engineer qualified to write specifications, supervise designing of plant, and making installations of equipment for a modern new steel plant with an opportunity to connect in a desirable position with the operating company. Our men know of this advertisement. Write Box 546, STEEL, Penton Bldg., Cleveland 13, Ohio.

Mechanical Engineer—
With foundry background for production supervision in HEAVY CENTRIFUGAL FOUNDRY NON-FERROUS. Reply Box 547, STEEL, Penton Bldg., Cleveland 13, Ohio.

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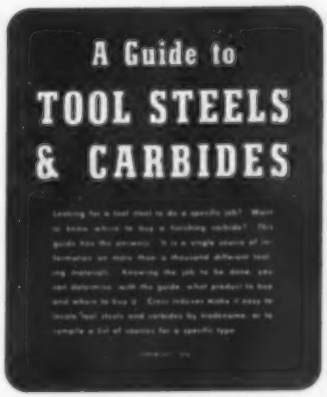


HERE'S HELP for your tooling problems

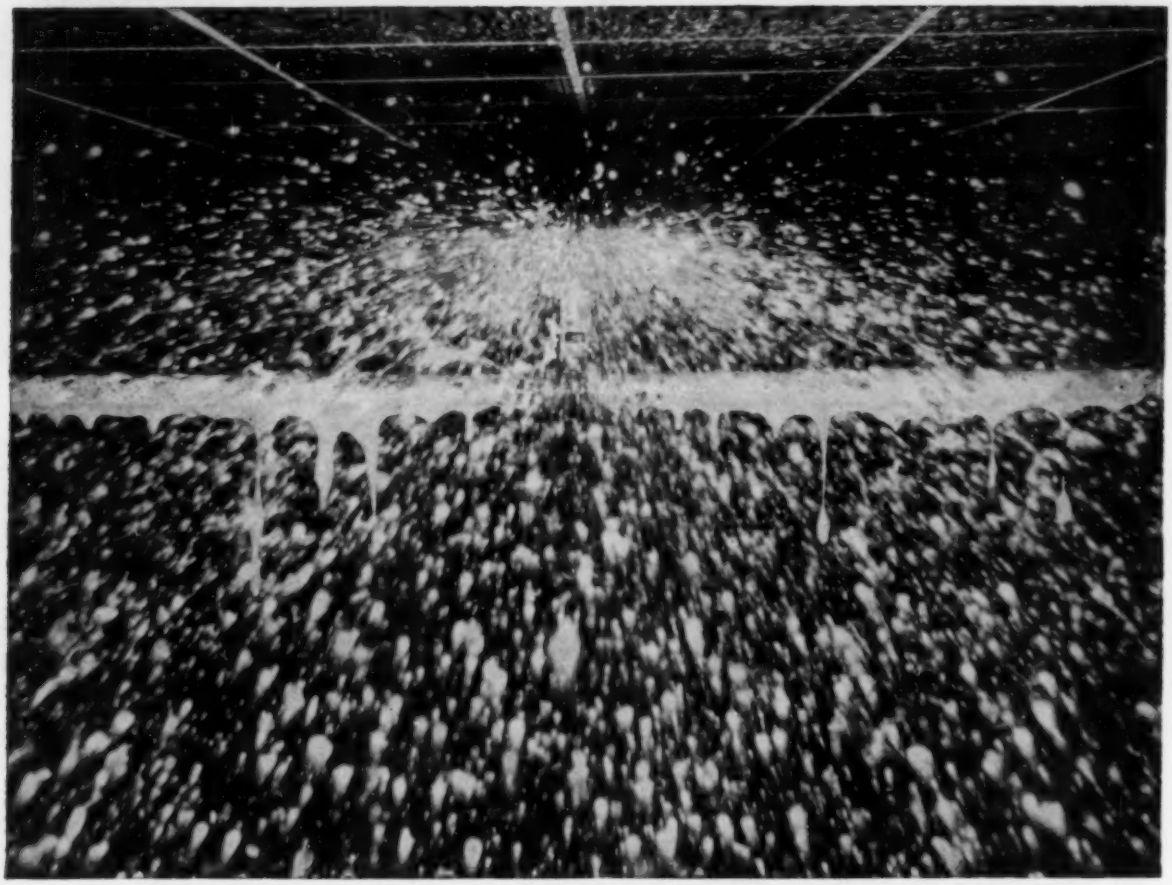
Looking for a tool steel to do a specific job? Want to know where to buy a finishing carbide? This guide has the answers. It is a single source of information on more than a thousand different tooling materials. Knowing the job to be done, you can determine, with the guide, what product to buy and where to buy it. Cross indexes make it easy to locate tool steels and carbides by tradename, or to compile a list of sources for a single type.

40 PAGES

Copies of the Guide to Tool Steels & Carbides are available from Editorial Service, STEEL, Penton Bldg., Cleveland 13, O., at the following prices:

1 to 10	$2.00 ea.
11 to 50	1.90 ea.
51 to 100	1.80 ea.
101 to 200	1.70 ea.
over 200	1.60 ea.

"Automatic" FOAM-WATER SPRINKLERS provide DOUBLE FIRE PROTECTION for Chemical Plants



A THICK BLANKET OF FOAM TO SMOTHER SPILL FIRES OF FLAMMABLE LIQUIDS —THEN A DELUGE OF WATER TO PREVENT DAMAGE FROM "TORCH" FIRES

AIRFOAM is generally recognized as the most effective means of extinguishing fast-spreading fires resulting from leaks or spills of flammable liquids. Foam nozzles, mixing air with a solution of water and foaming agent, produce a dense blanket of closely knit foam that smothers the fire by cutting off oxygen.

"Automatic" Sprinkler now combines AIRFOAM with WATER in a single system in which the same nozzles or sprinkler heads first discharge a large volume of thick foam that quickly extinguishes spill fires, then spray a deluge of water over the entire area to prevent fires above floor level from spreading or causing damage to structure of equipment.

The System automatically changes from FOAM to WATER when foam-producing material is exhausted, or may be changed manually before that time by shutting off foam liquid supply. Or, a blanket of foam may be laid at any time over a flammable liquid spill as a fire precaution. The foam blanket maintains its fire-smothering consistency under the deluge of water for 20 to 30 minutes.

Existing sprinkler systems may be modified to use FOAM-WATER sprinklers without involving re-design of piping.

"Automatic" Sprinkler

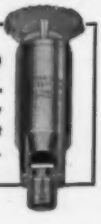
"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA

Dept. "S", YOUNGSTOWN 1, OHIO

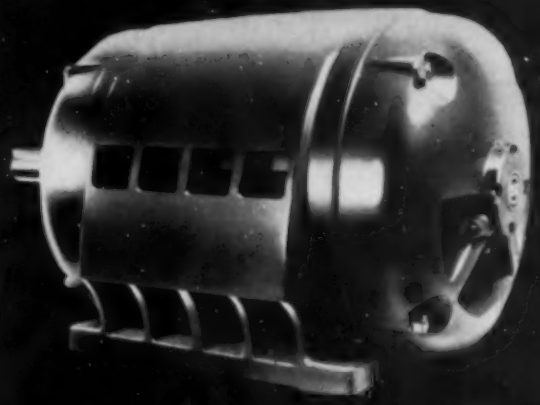
OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

NEWLY DESIGNED

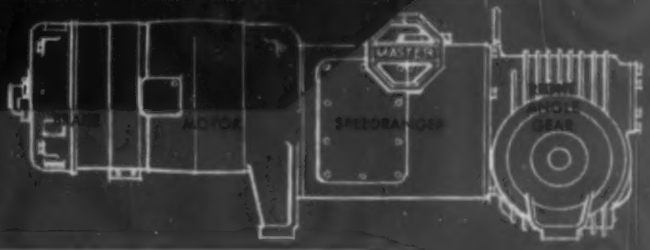
"Automatic" FOAM-WATER sprinklers are now available for either upright or pendent installation.



Your specialized drive requirements



Should meet their Master



Master Units Combine into Engineered, Customized Package Drives—Providing the Right Shaft Speed, the Right Construction Features, the Right Mounting. Why Put Up With Makeshift Assemblies?

Engineers and Manufacturers of

Electric Motors	**⅛ to 400 H.P.**
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Variable Speed Drives	**⅛ to 30 H.P.**
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Alternating current motors, direct current motors, generators . . . open, enclosed, explosion proof . . . with 5 types of gear reducers . . . with electric brakes . . . with mechanical or electronic variable speed units . . . with fluid drives . . . Master has them all and so can be completely impartial in helping to select the one best drive for you.

MASTER ELECTRIC MOTORS

THE MASTER ELECTRIC COMPANY, Dayton 1, Ohio

Puts squeeze on steel tubes...

TIMKEN® bearings put squeeze on costs

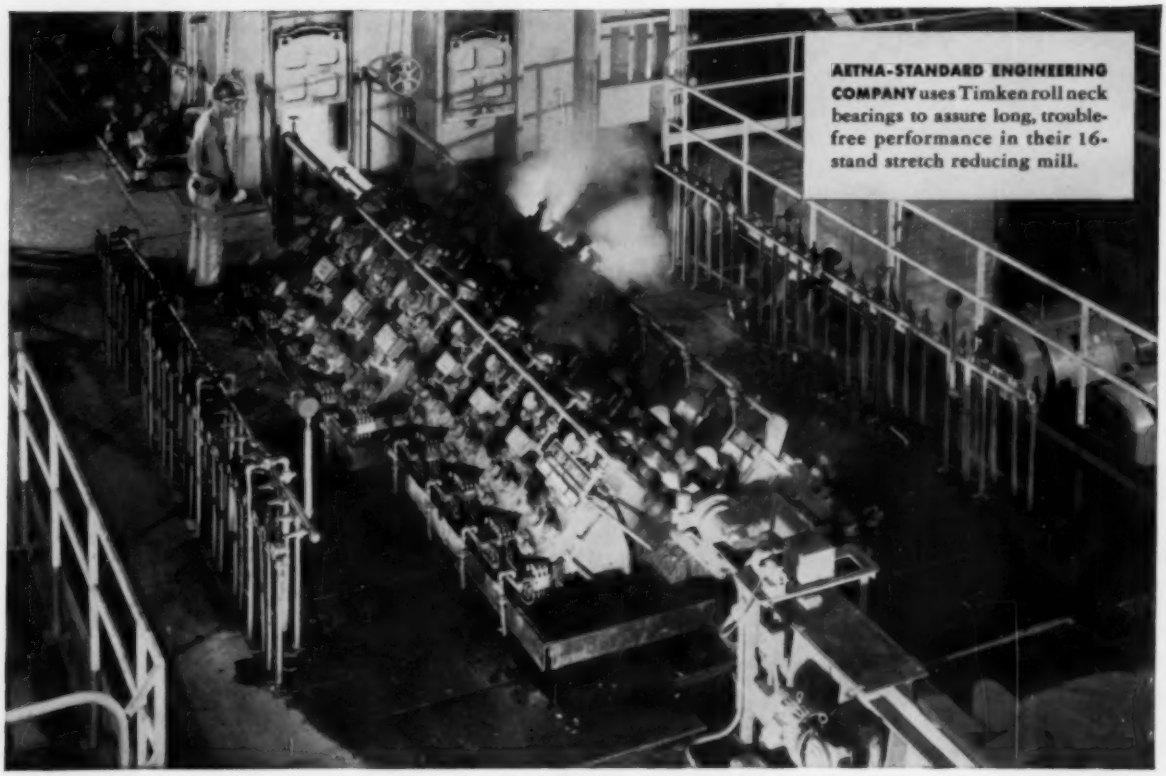
TO keep production high, downtime low, Aetna-Standard Engineering Company mounted the roll necks of their 16-stand tube stretch reducing mill on Timken® tapered roller bearings. One of the few of its kind in the world, this new mill, in operation at Jones & Laughlin Steel Corporation — Aliquippa Works, uses varying-speed rolls to reduce diameter and wall thickness of steel tubes.

Timken roll neck bearings give longer, trouble-free service because their balanced proportion design provides maximum bearing capacity in available space. And balanced proportion design means greater mill rigidity. With Timken bearings roll neck strength is increased 50% to 60% and load ratings up to 40%. Their tapered design enables them to take radial and thrust loads or any combination. No expensive thrust devices are needed.

Mills with Timken bearings can be started under full load. No steel is wasted because of disturbed gauge settings. Higher rolling speeds are possible because Timken bearings are designed for economical grease lubrication. Rolls can also be changed faster.

Why not get all these advantages in the machines you buy or build? Or in existing machines? Timken balanced proportion roll neck bearings can reduce downtime, cut costs for you, too. For full information, consult our roll neck specialists. Write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



AETNA-STANDARD ENGINEERING COMPANY uses Timken roll neck bearings to assure long, trouble-free performance in their 16-stand stretch reducing mill.

TIMKEN *TAPERED ROLLER BEARINGS ROLL THE LOAD*

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